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RANDOLPH AIR FORCE BASE WASTEWATER SURVEY, RANDOLPH AFB TX

A R M S T R O N G L A B O R A T O R Y

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This wastewater characterization effort ws conducted to meet 5 goals identified by Randolph AFB (RAFB) Civil Engineering Staff:

1: Assess RAFB's compliance with the Cibolo Creek Municipal Authority Industrial Waste Order (IWO);
2: Assess Oil/Water Separator (OWS) performance and determine presence of chemicals inhibitory to OWS operation;
3: Assess likelihood and extent of, and contributing factors to storm water infiltration/inflow;
4: Identify potential solutions to occasionally high chemical oxygen demand (COD) levels;
5: Determine levels of metals in base effluent.

These and other considerations are discussed in this report. RAFB generally complies with the IWO with the exception of most metals. The IWO discharge limits for metals are excessively restricitive and compliance will doubtably be attainable with the limits as established. OWSs generally perform well with the exception of two units outside the transportation maintenance building. COD values in composite samples were not above the IWO limit, so OEBW recommends that RAGB collect a split sample with CCMA to compare results. Contributing operations to high COD values include food preparation and non-destructive inspection facilities. Rainwater inflow and infiltration is significant, and costs RAFB several thousand dollars per year.

14. SUBJECT TERMS

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RANDOLPH AIR FORCE BASE WASTEWATER SURVEY

INTRODUCTION

Randolph Air Force Base (RAFB) is located in south central Texas in the northeast section of the San Antonio metropolitan area. The base is approximately 18 miles from downtown San Antonio and is surrounded by the communities of Cibolo, Converse, Live Oak, Schertz, Selma, and Universal City. The major missions of the base are instructor pilot and navigator training. Approximately 5,600 military and 2,700 civilian personnel work at Randolph, with a substantial number of military families residing on-base.

RAFB discharges wastewater to the Cibolo Creek Municipal Authority (CCMA) wastewater treatment plant (WWTP) located a few miles east of the base. All of the wastewater from RAFB collects at a pump station on the east side of the base where it is pumped directly to the WWTP. This lift station is the sampling point for CCMA personnel to test RAFB's wastewater for compliance with the industrial waste order (IWO) agreement between the two parties. RAFB contributes approximately 20-25 percent of the total flow entering the WWTP. Table 1, below, lists the quantitative limits included in the IWO. Appendix G provides Section 4 of the IWO, which details specific discharge prohibitions and other regulations included in the IWO.

TABLE 1. QUANTITATIVE DISCHARGE LIMITS

COMPOUND	LIMIT	COMPOUND	LIMIT
BOD_5	250 mg/L	Copper	16.0 ug/L
COD	625 mg/L	Lead	14.0 ug/L
TSS	250 mg/L	Manganese	2000 ug/L
pH	$5.5 \leq pH \leq 10.5$	Mercury	3.0 ug/L
Oil and Grease	200 mg/L	Nickel	14.0 ug/L
Arsenic	15.0 ug/L	Selenium	20.0 ug/L
Barium	2000 ug/L	Silver	1.0 ug/L
Cadmium	1.5 ug/L	Zinc	1.0 ug/L
Chromium (total)	13.0 ug/L		

RAFB Civil Engineering Environmental Flight (12 CES/CEV) requested the Water Quality Branch of Armstrong Laboratory's Bioenvironmental Engineering Division (AL/OEBW) to conduct a wastewater characterization survey at the base. RAFB identified five goals for this survey:

1. Assess RAFB's compliance with the CCMA IWO;
2. Assess Oil/Water Separator (OWS) performance and determine presence of chemicals inhibitory to OWS operation;
3. Assess likelihood and extent of, and contributing factors to storm water infiltration/inflow;
4. Identify potential solutions to occasionally high chemical oxygen demand (COD) levels;
5. Determine levels of metals in base effluent.

Of high concern to RAFB is the occurrence of high COD levels in the effluent. The CCMA IWO prohibits discharges of wastewater having COD levels greater than 625 mg/L. CCMA charges $500 for each occurrence of COD greater than 700 mg/L. CCMA staff collect and analyze a grab sample from the RAFB effluent lift station about once per week. During the last five years, RAFB has been fined a total of greater than $20,000 for COD exceedances. Presently, CCMA uses only COD tests to determine the strength of the sewage and does not regularly measure for other parameters regulated by the IWO.

In April 1985 the Environmental Quality Branch of the USAF Occupational and Environmental Health Laboratory's Aerospace Medical Division (USAFOEHL/ECQ), predecessors to AL/OEBW, performed a wastewater survey to determine the sources of high COD levels at RAFB. At that time, the main contribution to the COD problem came from garbage grinding operations at food serving facilities throughout the base. Industrial contributions to COD levels were minimal in comparison to the food grinding operations.

As part of a study to identify deficiencies in wastewater treatment systems throughout the Air Force by the Air Force Civil Engineer Support Agency, Geo-Marine Inc. (GMI) conducted a wastewater survey at RAFB during June 1994. GMI reported that COD levels of RAFB's wastewater have significantly improved since 1985 when garbage grinding operations were discontinued, but recognized that occasional exceedances still occur. GMI concluded that the COD levels in RAFB's wastewater were not a significant problem, based on discussions with CCMA plant personnel and in comparison to generally accepted qualification of wastewater. Wastewater with COD levels between 500 and 1000 mg/L is considered medium strength wastewater, and GMI indicated that typical COD levels in RAFB's effluent have no detrimental effects at the WWTP. According to GMI's report, CCMA is more concerned with the WWTP's toxicity problems than with COD, and potential contributions of metals and other industrial or toxic chemicals and their effects on the WWTP are of concern to both RAFB and CCMA. As part of the effort to characterize the sewage at RAFB, CEV personnel indicated the necessity to assess the performance of OWSs and determine the presence of chemicals which inhibit their proper operation. If not properly working, OWSs may contribute significant industrial chemicals to the sanitary sewers.

The IWO also prohibits storm water from entering the sanitary sewer system so RAFB is concerned with potential infiltration and inflow of storm water to the sanitary sewer. CCMA charges RAFB $1.40 per 1,000 gallons of wastewater. Savings to RAFB can be made by eliminating any storm water contributions to total base flow.

SAMPLING METHODOLOGY

To determine sampling locations for the wastewater characterization, personnel from OEBW and 12 CES/CEVC reviewed a general layout of the base and noted potential contributors of industrial chemicals or high COD waste streams. Based on the locations of these organizations, the availability of sampling points at or near the sites, and the potential workload versus availability of personnel, OEBW chose several sampling sites. OEBW believed that these sites would adequately characterize the base sewage and allow contributing operations to be identified. Table 2, below, lists the sites chosen for this survey. Appendix A provides a base map, indicating site locations by the numbers identified below.

TABLE 2. SAMPLING SITE DESCRIPTIONS

SITE #	SITE	DESCRIPTION/CONTRIBUTING OPERATIONS
1	Base Effluent	Lift station off of Farm Road 1518.
2	South Sewer Line	Manhole outside base effluent lift station representing South Sewer line flow.
3	North Sewer Line	Manhole near new hush house on NE side of base. Represents North Sewer Line flow.
4	North Housing Area	Manhole by softball field at intersection of Fifth St East and New B St East. Collects water from North housing and dormitories.
5	Northeast Flightline	Manhole behind AGE (Bldg. 16). All NE flightline shops drain to this spot, including pizza parlor and graphics support.
6	NCO Club	Manhole on SW corner of NCO club yard. Also gets minor flow from two housing units.
7	Dining Hall, CUP School	Manhole outside front entrance to Airmen's dining hall. Grease traps at CUP school and flight kitchen flow to this manhole.
8	Officer Housing Area	Manhole near Bldg. 636. Represents about 1/4 of officer housing units.
9	Officers' Club	Manhole by grease trap, near O-club pool.
10	Bowling Alley	Manhole on H Street West next to bowling alley. Collects water from the lift station by the Arts & Crafts Center, the classrooms by the bowling alley, the bowling alley, and buildings 61-64 (Bead Blasting, CE, PMEL, OPS).
11	Burger Bar / BX	Manhole next to Burger Bar grease trap. All buildings between Clinic and Burger Bar, inclusive, and the BX, drain to this spot.
12	Clinic	Manhole outside gate of POL yard. Clinic is main contributor.
13	High School	Manhole by high school lift station.
G1	Auto Hobby OWS (by Bldg. 893)	Collects water from the washracks at the Auto Hobby Shop.
G2	OWS 11662 (by Bldg. 44)	Collects water from wash bay (11661), apron area nearby, and floor drains of Bldg. 44.
G3	AGE Washrack OWS (by Bldg. 16)	Collects water from AGE washrack and apron area.
G4	Refueling Maint. OWS (by Bldg. 22)	Collects water from floor drains of the refueling truck maintenance building.
G5	T-38 Washrack OWS (by Bldg. 5)	Collects water from T-38 Washrack and surrounding apron.
G6	T-38 Washrack Pit (by Bldg. 3)	This pit collects water from the covered T-38 washrack and surrounding apron area and routes it to the OWS by Bldg. 5.
G7	Vehicle Maint. OWSs (by Bldg. 171)	Two OWSs, one in front of and one behind Bldg. 171. Collect water from floor drains of vehicle maintenance building.

TABLE 2. CONTINUED

SITE #	SITE	DESCRIPTION/CONTRIBUTING OPERATIONS
G8	Vehicle Maint. Washrack (by Bldg. 175)	Large OWS that collects water from vehicle maintenance washrack and parking area nearby Bldg. 175.
G9	Housing Maint. OWS	Collects water from the washracks at housing maintenance, pesticide management, hush house (Bldg. 85), and the nearby parking area.
G10	NDI	Water sample taken from rinse basins.
G11	Corrosion Control	Water sample taken from paint booth. Booth is emptied once per week on Thursday or Friday afternoon.
G12	Arts and Crafts Lift Station	Lift Station behind Bldg. 895. Receives water from the OWS and buildings near the Auto Hobby Shop, and from the Arts & Crafts building.
G13	Golf Course Lift Station	Collects water from golf course club house, washrack and floor drains of golf course maintenance area.

Table 3 lists the chemicals analyzed at each site. For sites where composite sampling was performed, OEBW personnel installed a 24-hour time composite sampler to draw a sample every 1/2 to 1 hour for a 24 hour period. The sample aliquots were collected in a single container chilled with ice. At the end of a 24 hour period the jug of composite sample was stirred and poured directly into sample containers for laboratory analyses. The composite sampling method provides a picture of the entire day's activities. This sampling was performed during periods where the highest activity was anticipated. For example, industrial activities were sampled during workdays, and housing areas and clubs during weekends.

Other activities are adequately characterized by grab sampling, because the nature of the system or operation provides a fairly representative sample at any time. Examples of such systems are OWSs or lift stations receiving consistent or low flows. OWS samples were taken from influent and effluent chambers of the separators. One separator (Bldg. 22) is a pit that has a drain pipe which draws water from the bottom of the pit. The sample from this OWS was taken from the bottom of the water by submerging a sampling device into the water. Some analyses, including O&G/TPH, TSS, and VOC/SVOC, require grab samples to be taken. These grabs were collected in a precleaned stainless-steel pitcher and poured into sample containers.

TABLE 3. ANALYSES PERFORMED

SITE #	SITE DESCRIPTION	SAMPLE TYPE	ANALYSES PERFORMED
1	Base Effluent	24 Hr. Comp, Grabs, 7 days	VOC/SVOC (EPA 8021), Metals (EPA 200.7: Screen, 200.8:Cd, 200.9:Zn, 245.1:Hg), O&G/TPH (EPA 413), COD (EPA 410.1), Cyanide (EPA 335.3), Phenols (EPA 420.1), TSS (EPA 160.2), Phthalates (EPA 606), TTO (EPA 608, 624, 625), Herbicides (EPA 615); Note: TTO and Herbicides only on two of seven days.

TABLE 3. CONTINUED

SITE #	SITE DESCRIPTION	SAMPLE TYPE	ANALYSES PERFORMED
2	South Sewer Line	24 Hr. Comp, Grabs, 2 days	COD, TTO (on one of two days)
3	North Sewer Line	24 Hr. Comp, Grabs, 2 days	COD, TTO (on one of two days)
4	North Housing Area	24 Hr. Comp, Grabs, 3 days	COD, O&G, Phenols, TSS
5	Northeast Flightline	24 Hr. Comp, Grabs, 3 days	VOC/SVOC, Metals, O&G/TPH, COD, Cyanide, TSS
6	NCO Club	24 Hr. Comp, Grabs, 3 days	COD, O&G, TSS
7	Dining Hall, CUP School	24 Hr. Comp, Grabs, 3 days	COD, O&G, Phenols, TSS
8	Officer Housing Area	24 Hr. Comp, Grabs, 3 days	COD, O&G, TSS
9	Officers' Club	24 Hr. Comp, Grabs, 3 days	COD, O&G, TSS
10	Bowling Alley	24 Hr. Comp, Grabs, 3 days	COD, O&G, TSS
11	Burger Bar / BX	24 Hr. Comp, Grabs, 3 days	COD, O&G, TSS
12	Clinic	24 Hr. Comp, Grabs, 3 days	Silver, Molybdenum, Cyanide, O&G, COD, Phenols, TSS
13	High School	24 Hr. Comp, Grabs, 3 days	Metals, O&G, COD, Phenols, TSS
G1	Auto Hobby OWS (by Bldg. 893)	Grab	VOC/SVOC, Metals, Cadmium, Mercury, Zinc, O&G/TPH, COD, MBAS (EPA 425.1), TSS
G2	OWS 11662 (by Bldg. 44)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G3	Refueling Maint. OWS (by Bldg. 22)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G4	Age Washrack OWS (by Bldg. 16)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G5	T-38 Washrack OWS (by Bldg. 5)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G6	T-38 Washrack Pit (by Bldg. 3)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G7	Vehicle Maint. OWSs (by Bldg. 171)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G8	Vehicle Maint. Washrack (by Bldg. 175)	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS
G9	Housing Maint. OWS	Grab	VOC/SVOC, Metals, O&G/TPH, COD, MBAS, TSS, Pesticides (EPA 608), Herbicides
G10	NDI	Grab	Metals, COD, Cyanide, Phthalates
G11	Corrosion Control	Grab	Metals, COD, TSS, VOC/SVOC
G12	Arts and Crafts Lift Station	Grab	VOC/SVOC, COD, O&G/TPH, TSS
G13	Golf Course	Grab	COD, O&G/TPH, TSS, Pesticides, Herbicides

<u>Quality Assurance/Quality Control</u>

A field Quality Assurance/Quality Control (QA/QC) program was used during this evaluation to verify the accuracy and reproducibility of laboratory results. The following is an enumeration of samples sent to the analytical laboratory to validate the integrity of the samples collected:

<u>Equipment Blank Sample:</u> Equipment blank samples were collected by pouring laboratory grade water through the sampling collection media (pitcher, sampler, etc.) into the appropriate sample container. Preservation and packing was conducted in the same manner as the normally collected samples. This sampling series serves as a check on contamination from sampling media.

<u>Spike Samples:</u> Spike samples were collected by filling the appropriate sample containers with a laboratory prepared, known concentration, spike standard solution. The spike standard solutions were prepared in accordance with the manufacturer instructions by Armstrong Laboratory Analytical Service Division (AL/OEA) Quality Assurance, Quality Control Branch. This series of samples in conjunction with AL/OEA Quality Assurance Plan serves as check on the sample collection preservation, and reproducibility of analytical results.

<u>Duplicate Samples:</u> Duplicate samples are aliquots taken from the same source, and analyzed independently. These samples serve as a measure of precision, which is the agreement between a set of replicate measurements without assumption or knowledge of the true value.

<u>Reagent Blank Samples</u>: Reagent blank samples were collected by filling the appropriate analysis sample container with laboratory grade water and placing the preservative into the container. This series serves as a check on the purity of the reagents used and elimination of any preservative contributing to false analytical results.

RESULTS AND DISCUSSION

This section addresses each of the goals that RAFB identified for this survey. A discussion of water conservation issues and other survey findings are also presented in this section.

<u>Goal #1: Assess RAFB's Compliance with the CCMA IWO.</u>

The IWO provides effluent limitations as shown in Table 1. Table 4, below, compares the quantitative discharge limits for metals as printed in the IWO to drinking water standards and inhibitory levels to biological processes like those in operation at the CCMA WWTP (Aerobic Fixed Film/ Anaerobic Digestion). Based on this information, OEBW believes that these standards are overly restrictive, and suggests that RAFB work to amend the IWO to ease the limits. Currently, CCMA does not test nor cite RAFB for exceeding these limits. However, the practice of accepting these discharge limits, which RAFB has little chance of ever meeting, should be stopped. A precedence of not contesting these limits opens the door for accepting notices of violation and fines in the future. The discharge limits in CCMA's NPDES permit will influence the IWO criteria and possible changes to the criteria.

TABLE 4. CONTAMINANT LIMIT COMPARISON (ug/L)

ANALYTE	IWO LIMIT	SDWA LIMIT	INHIBITORY RANGE
Arsenic	15	50	290000/ 100-1000
Cadmium	1.5	5	5000-20000/20-1000
Chromium	13	100	50000/ 1500-50000
Copper	16	1300	25000-50000/ 500-100000
Lead	14	50	N/A/ 50000-250000
Nickel	14	100	N/A/ 2000-200000
Selenium	20	50	No Data
Silver	3	1000	N/A/ N/A
Zinc	1	5000	N/A/ 1000-10000

In addition to these specific quantitative limits, prohibited discharges include antimony, beryllium, bismuth, cobalt, molybdenum, tin, uranyl ion, rhenium, strontium, tellurium, herbicides, fungicides, and pesticides. OEBW analyzed the base effluent for levels of antimony, beryllium, cobalt, molybdenum, herbicides and pesticides. Of these parameters, only molybdenum was detected. CCMA expressed concern for the presence of molybdenum because the treatment plant is nearing its limit for molybdenum in the land-applied sludge. Molybdenum was detected on only two of seven days in the base effluent at levels just above the analytical method detection limits. Molybdenum was detected in samples drawn from the OWSs at Bldg. 171 (Transportation Vehicle Maintenance), the Auto Hobby Shop (Bldg. 893), and the T-38 washrack pit (by Bldg. 3). RAFB should investigate chemical usage listings for these operations to determine potential sources of molybdenum. Molybdenum is commonly used in aircraft components, machine tool accessories, corrosion inhibitors, and pigments for paints, dyes, and lacquers. Molybdenum is also an essential micronutrient, and common in all natural waters.

COD levels in the base effluent did not exceed the IWO limit. The highest reported COD value was 407 mg/L. Based on these results, RAFB does not appear to have a consistent problem with COD. However, CCMA takes grab samples for COD, usually on Thursday or Friday afternoon, and these might differ from the time composite samples taken during this survey.

One day of sampling showed high Oil and Grease and TPH levels in the effluent. Compared to other analytical results for this day (12 May), these high levels are likely the result of contamination or analytical error. If they were accurate, COD and BTEX results, would likely be higher.

Biochemical Oxygen Demand (BOD) samples were run from selected sites by the CCMA staff. High results were reported from the O-Club (319 mg/L, Sat. 13 May), North Housing Area (342 mg/L, Sat. 13 May), and the North Sewer Line (298 mg/L, Tue. 16 May). On 16 May, the BOD level from the Base Effluent was reported as >600 mg/L. The corresponding COD for this day was 284 mg/L. The BOD test was not run to completion because the oxygen level was not sufficient, so the result cannot be considered valid. The BOD limit set by the IWO is 250 mg/L, which would be typical of a medium strength wastewater.

No pesticides and herbicides were detected in the base effluent. Lindane was detected in the North Sewer lines on one day, but the base effluent was not tested on this day.

Appendix B provides the complete analytical reports for this survey. Values exceeding the IWO permit limits are highlighted in grey.

Goal #2: Assess Oil/Water Separator (OWS) Performance and Determine Presence of Chemicals Inhibitory to OWS Operation.

Properly operating OWSs should remove oil and grease from wastewater to about 100 mg/L. (The IWO prohibits wastewaters having greater than 200 mg/L from entering the treatment plant.) Several factors can inhibit the separation process of a gravity OWS. If the flow into an OWS exceeds the design level, there will not be adequate time for globules of oils and grease to rise to the surface of the water where they can be adequately skimmed off. Instead, some oil and grease will exit, or "pass through" the separator. The presence of alkaline detergents, surfactants, emulsifiers, and degreasing agents also inhibits the proper operation of OWSs. These compounds prevent the oil from forming globules large enough to rise to the water surface, contributing to the "passing through" of the oil products. Very low, or very high pH values can also increase the solubility of oil products in the wastewater. Lack of maintenance for OWSs may also contribute to contamination problems.

Operations which use the OWSs should avoid purposely introducing any chemicals into the separators which will inhibit the separation process. Whenever possible, excess oils and greases should be cleaned with rags or collected in drip pans. Personnel should be trained to know and use the proper concentrations and mixing ratios for detergents and degreasers, and minimize their use wherever possible.

Most of the OWSs in operation at RAFB pump water from a wet well into the separator. During the survey these pumps were manually operated, and most of them appear to pump at rates which are too high for the separators. Reducing the pump flow rates will allow more time for proper oil/water separation, and minimize the emulsification and turbulence caused by fast pumping, resulting in better OWS performance.

Table 5, below, discusses each OWS investigated, including comments regarding relevant analytical results. Full analytical reports are located in Appendix 2. Some metals, including chromium, may come from the separators themselves, most of which are made of stainless steel.

TABLE 5. OIL/WATER SEPARATOR ANALYSIS

SEPARATOR SITE	COMMENTS
Auto Hobby Shop	* Oil and Grease results from this separator show that the OWS is functioning properly. The high COD values in the effluent may correspond to high surfactant loading. * The pump for this OWS is pumping at a high rate, which emulsifies the oils and greases, and may be overloading the separator. RAFB should try to reduce the pumping rate.
Building 44	* This OWS has low Oil and Grease levels in both the influent and effluent, but these values are nearly the same, which means that the separator is not removing any of the oil or grease from the water. The presence of surfactants and industrial solvents (TCE, DCE) in this separator may be contributing to the flow through of the oils and greases. * The levels of cadmium and chromium in this separator are high relative to other separators, and may be due to the nearby painting operations or the washing operations in Building 44.

TABLE 5. CONTINUED

SEPARATOR SITE	COMMENTS
AGE	* The influent to this separator has very high Oil and Grease levels (1424 mg/L), which are lowered to 224 mg/L in the effluent. This level is above the 100 mg/L desired, but considering the influent levels, it shows the separator is removing significant quantities. This is a high use separator, and the flow may be too high to remove oil and grease to 100 mg/L. * Surfactants and solvents do not appear to be causing problems with this unit. * This unit is receiving runoff from a large apron area.
Refueling Maintenance	* This separator is a large pit that drains water from the bottom, through an elbow pipe. At the time of the survey, there were several inches of fuel on top of the water. Because of the likelihood of contamination and high use at this site, a proper OWS should be installed. There are at least three OWSs currently not in use (Building 40 and two at Building 245) which could be used at this site. * Oil and Grease levels in the sample from this pit measured 1408 mg/L. The COD value of 920 mg/L is also high, but considering the large amounts of fuel in the water, this value is not surprising. * The large quantity of fuel in this pit indicates that better management practices might be used by this shop. As discussed above, drip pans and absorbent material should be used whenever possible.
T-38 Washrack (Bldg. 5)	* This separator seems to be operating properly. Analytical results show higher levels of oils and greases in the effluent than the influent, but the effluent result is lower than the IWO permit value of 200 mg/L. * The COD value greater than 700 is likely due to the surfactants used for washing the T-38s.
Vehicle Maintenance, N. Side (171 #1)	* This separator had thick layers of oils and greases, thick sediment buildup, and appeared like it had not been serviced recently or regularly. There were high levels of COD, O&G, TPH, metals (including molybdenum), surfactants, toluene and xylene in the effluent from this separator. * Based on the appearance of this separator, it is probably undersized. * Shop practices should be reviewed to insure that wherever possible, oils and fuel are prevented from entering the separator.
Vehicle Maintenance, S. Side (171 #2)	* Same comments as 171 #1. In addition, low pH values may be contributing to the high contaminant levels in the effluent.
T-38 Washrack Pit	* This pit is located under the covered washrack for T-38s. It is not a separator, but serves as an indicator of the influent to the separator located by Bldg. 5 and the wastewater from washing operations. * Samples from this pit displayed high COD and metals levels (including cadmium, chromium, and molybdenum). The metals are probably released from the paint and aircraft surfaces during scrubbing. The high COD might be from the detergent.
Housing Maintenance	* This separator seems to be clean, and operating properly. The main problem with this separator is that it receives significant amounts of runoff from parking areas and storm drains. * No pesticides and herbicides were detected in this unit. The washrack outside the entomology shop discharges into this separator.

Goal #3: Assess Likelihood, Extent of, and Contributing Factors to Storm Water Infiltration/Inflow.

OEBW obtained sewer flow and rainfall information from September 1991 to May 1995. Sewer flow represented daily totals in gallons passing through the effluent lift station, and rainfall was measured in hundredths of inches per day. AL/CFTO, the Statistical Function of Armstrong Laboratory's Sustained Operations Branch, Crew Technology Division, evaluated this information to provide a statistical assessment of the rainfall infiltration/inflow to the sanitary sewer.

Based on the evaluation of rainfall and sanitary sewer flow over the last 4 years, there is evidence of significant influence of rainfall on the total base flow, especially when the rainfall is greater than 0.09 inches. From the data, we can estimate that RAFB pays on the average more than $15K per fiscal year for treatment of rainwater. Appendix C (five pages) shows the rainfall versus lift station flow by day from September 1991 thru 15 August 1995. It is apparent on these graphs that peaks in flow correspond well with the occurrence of rainfall. The graphs in Appendix D pair the daily flow to the average of the same day's rain and the two previous days' rain. These graphs show an even stronger correlation between the daily sewer flow and the amount of rain over the three day period. The stronger correlation suggests that the rainfall has about a two to three day period of influence on the sewer flow. Appendix E provides a graph which compiles all of the sewer flow and rainfall information (1353 days) and plots the flow versus rainfall ranges in a "box and whisker" diagram. The ends of the boxes represent the 25th and 75th percentile ranges and the line in the box represents the 50th percentile, or median value of the flow information for the days having that amount of rainfall. The ends of the lines extending from the boxes represent the high and low values for that group. Next to the boxes the "n = #" gives the number of data points in that group. A small box means that data are grouped tightly together. Appendix F provides a similar graph, but again, it uses the average of three days worth of rainfall data (same day and two previous) rather than just the same day's rainfall. These two graphs show that there is a significant influence on sewer flow when the rainfall is more than 0.09", and that the effect increases as the amount of rainfall increases. By using the mean of three days worth of rainfall data, the grouping becomes somewhat tighter, and the influence of rainfall on the sewer flow more apparent. There is about an 18% increase in the correlation based on three days worth of data versus the same day data. The correlation between the rainfall and sewer flow cannot be used in a predictive manner, but indicates a significant relationship between the two. The type of storm and the time and weather between storm events will influence the amount of increase in sewer flow due to rainfall.

There are several possible contributors to the infiltration/inflow problem. Many manhole lids at RAFB are below grade (i.e., lower than the surrounding ground surface). During lawn watering and storm events, water runoff drains into these manholes, and can contribute significant amounts of flow to the sanitary sewer. Flow into these manholes is facilitated by holes drilled into many of the lids (common practice). One method of preventing significant amounts of runoff from entering the sewer is to get plastic storm lids fitted to the manholes. These covers fit below the manhole lid and are easily removed when access to the manhole is necessary. Manhole lids without holes are also available, and can reduce the amount of surface runoff entering the sewer. Another option is to raise the level of the manhole above the surrounding area.

Many manholes on RAFB, notably older ones, are constructed from bricks. Because of the age of these structures, several are cracked, crumbling, or the mortar has deteriorated. These decrepit conditions contribute to infiltration of water from the ground to the sanitary sewer. RAFB is currently upgrading much of the sewer system, and continuation of this project will reduce the amount of infiltration into the system. The delayed influence of the rain on the sewer flow might indicate groundwater infiltration problems.

Several OWSs collect water that runs off apron and parking areas. Some of the systems have storm water overflows, which are designed to divert high flows to the storm sewer rather than allowing it all to go to the OWS wet wells. However, rain water and parking lot runoff still enters the OWSs. Ideally, washracks should be covered, and the surrounding apron or parking areas graded away from the OWS to prevent stormwater inflow to the sanitary sewer through the OWSs. Almost all of the identified OWSs, with the exception of those at Bldgs. 171 and 22 are collecting water from large paved areas.

Goal #4: Identify Potential Solutions to High Chemical Oxygen Demand (COD) Levels.

As stated in the AFCESA report, COD levels between 500 and 1000 mg/L are considered to be medium strength. Strong COD levels are those over 1000 mg/L. The IWO limit for COD is 625 mg/L, and RAFB receives a $500 fine for any COD result greater than 700 mg/L. The highest detected COD during the seven days of sampling at the base effluent was 407 mg/L. These were 24 hour time composite samples. CCMA usually takes a grab sample on Thursday or Friday afternoon to test for COD.

It is possible that the CCMA test results are inaccurate. OEBW suggests that RAFB send a split sample to another certified laboratory for analysis and comparison to CCMA results. Industrial or other operations may contribute to unusually high COD levels at various times throughout the day, which might not be detected in time proportional composite sampling. If CCMA's results coincide with a split sample analyzed at another laboratory, then the indication is stronger that daily operations at RAFB are contributing to occasionally high COD values.

Data from several sites indicate potential sources of high COD. The highest COD value reported came from the rinse water at the NDI facility, measuring 9,040 mg/L. A simple way to reduce the COD in this rinse water would be to allow more time for the parts to drip before rinsing. The next highest reported COD value was 2,000 mg/L at the Dining Hall. This result suggests that food preparation operations may be contributing to high COD values at the base effluent, and would explain high COD values during weekends and other hours when industrial operations are down. RAFB should insure that minimal amounts of food solids are sent down the drains. Other COD values exceeding 700 mg/L were found at the O-Club, and the Clinic. As with the Dining Hall, the O-Club should minimize the amounts of food solids being disposed of down the drains. In addition, the water exiting the O-Club (flowing through the grease trap) was 104 degrees Fahrenheit on the day recording the highest COD value. These high temperatures may be dissolving the grease in the grease trap, thus contributing to high COD.

Several of the Oil/Water Separators recorded high COD levels. These include the OWSs from Building 171 (Vehicle Maintenance), The T-38 Washrack pit and OWS, the AGE washrack, and the Refueling Truck Maintenance shop (Building 22). Compounds that contribute to high COD levels in OWS effluents include the oil and grease products that are not removed and the cleaning compounds and detergents used in the shops. Proper operation and maintenance of OWSs, and good housekeeping and shop management procedures will reduce the COD values in the effluents from the OWSs. The operation and maintenance of OWSs was discussed above.

Goal #5: Determine Levels of Metals in Base Effluent.

Table 6 shows the metals results from analyses of 24 hour composite samples from the base effluent lift station. Any metals that were not detected are not shown in this table. Lead and copper exceed the IWO limits on all days, however, the limits set by the IWO are below the Safe Drinking Water Act (SDWA) standards. The levels of lead and copper detected are barely in the range of concentrations inhibitory for biological processes. The inhibitory range of copper for activated sludge processes is 0.1-1mg/L, and of lead it is 0.1-10 mg/L. The SDWA regulatory limit for copper is 1.3 mg/L, and for lead is 0.015 mg/L. Cadmium and chromium also exceed the IWO limit, but are either very close to the limit value, or of the same order of magnitude. Relatively high chromium levels were detected in the paint booth water at the corrosion control facility, but these levels were below those required by federal pretreatment standards.

TABLE 6. METALS RESULTS, BASE EFFLUENT

Metal	Fri 12 May	Sat 13 May	Sun 14 May	Mon 15 May	Tue 16 May	Wed 17 May	Thu 18 May	High	Avg	IWO limit
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Aluminum	2.62	0.94	4.71	4.94	3.27	4.64	3.65/ 6.59	6.59	3.92	–
Barium	0.183	0.115	0.252	0.257	0.245	0.341	0.306/ 0.537	0.537	0.28	2
Cadmium	0.004	0.003	0.004	0.003	0.001	0.002	0.002/ 0.003	0.004	0.0028	0.0015
Chromium	ND	ND	0.01	0.017	ND	0.011	0.011/ 0.027	0.027	0.052	0.013
Copper	0.158	0.097	0.23	0.189	0.052	0.279	0.256/ 0.443	0.443	0.213	0.016
Iron	1.26	0.428	1.79	1.98	1.43	2.63	3.12/ 7.61	7.61	2.531	–
Lead	0.036	0.008	0.029	0.046	0.026	0.044	0.049/ 0.081	0.081	0.040	0.014
Manganese	0.034	ND	0.03	0.036	ND	0.04	0.034/ 0.060	0.060	0.029	2
Mercury	0.0006	ND	0.0006	0.003	ND	0.0006	0.004/ 0.002	0.004	0.0014	0.003
Molybdenum	ND	ND	ND	ND	ND	0.033	0.037/ 0.043	0.043	0.014	–
Nickel	ND	ND	ND	ND	ND	ND	ND/ 0.074	0.074	0.001	0.014
Silver	0.02	ND	0.012	0.016	ND	0.018	0.025/ 0.063	0.063	0.019	0.003
Titanium	ND	ND	0.085	ND	ND	ND	ND	0.085	0.011	–
Zinc	0.208	0.1	0.291	0.28	0.238	0.396	0.354/ 0.676	0.676	0.318	0.001

General Survey Observations

OEBW used a sanitary sewer map dated 23 March 1989 to plan and conduct this survey. Unfortunately, this map is not up to date and did not match the actual plumbing on the base. RAFB must insure that recent updates and new construction to the sewer system are correctly mapped into the computer drawings. The importance of this issue should not be underrated. Emergency actions for spill response or other potential incidents require accurate sewer maps. In addition, many sanitary sewer manholes have storm drain lids, and vice versa. RAFB should correct these problems to prevent confusion in emergency situations.

Visual inspection of the hazardous waste collection point between buildings 48 and 847, and the associated sewer system revealed a possible connection to the sanitary sewer of the floor drains in this facility. There are also hoses in this storage shed. RAFB should insure that any connections to the sanitary sewer from the floor drains are eliminated. Spill containment should be used in such a facility, rather than having open connections to the sewer system. It should be noted that OEBW did not try to confirm a connection between the floor drains and the sewer because the gates to the facility were locked. The floor drains can be tested by allowing a water hose to run into them and observing if the water flows out, and if so, to where it drains.

The grease trap outside the Burger Bar is missing an effluent pipe, which would prevent solids from leaving the trap. The pipe should be an elbow which allows water to drain from the bottom of the trap. As it is now, the grease and other solids on top of the water are freely flowing out of the trap into the sanitary sewer. This could be a contributing factor to high COD values.

RAFB expressed concern with two phthalate compounds commonly detected in the wastewater. Research into the use of these chemicals (bis(2-ethylhexyl)phthalate and diethyl phthalate) indicate that they are plasticizing compounds found in plastics, rubbers, dyes, perfumes, cosmetics, and various other products. Contamination can come from drinking water lines, sample collection media, and laboratory apparatus among other things. The levels found in the RAFB sanitary sewer water are not significant and these compounds are readily degraded in sewage treatment plants.

The OWS at the new hush house on the north side of the base was under about a foot of water, and was not sampled. The nearby manhole showed visible fuel products on the surface of the water, indicating that this OWS needs servicing, and might not be working.

QA/QC results show that sampling procedures did not contribute significant contamination to the samples, and that laboratory results are reliable. Other observations noted during the survey are listed below:

- There is a sanitary sewer lid on a storm drain manhole by the OWS near Bldg. 5.
- The sewer confluence from the north housing area and the line coming from vehicle maintenance was backed up toward vehicle maintenance (Bldg. 171).
- The separator pit on the North side of Building 171 (Separator 171 #1) was filled with about one foot of water
- The manhole behind the Dining Hall/Culinary Upgrade (CUP) School, down line from the grease trap by the CUP school, is below grade and has a storm sewer lid.
- The cleanout plug by the flight kitchen has a pop can jammed down inside of it.

Water Conservation

Water conservation is becoming an increasingly important topic. San Antonio and the surrounding area are realizing the influence that threatened or diminished water supplies can have on a base or community. The necessity to properly manage precious water resources is apparent, and the Air Force should take the lead in developing and implementing positive and resourceful plans to minimize water loss and waste, and maximize the efficient use of water.

During this survey, OEBW identified several instances of unexemplary water use. Several locations were watering lawns during the daytime, notably between the hours of 1000 and 1600. The San Antonio Water System recommends that sprinkler watering ***not*** be conducted between the hours of 1000 and 2000. Much of the water will evaporate due to the sun and high temperatures. Watering by hand, drip systems, or large buckets is acceptable at any time of the day.

The NCO-Club, O-Club, Dining Hall, ball fields, and several housing units were among those locations where sprinklers were running during peak heat and sun hours of the day. In some cases, several sprinklers were operating at a location, and were not moved during the several hours that OEBW was on location performing the survey. OEBW recognizes that at the time of this survey, neither voluntary nor mandatory water conservation procedures were in effect. However, efficient year-round watering can prevent the occurrence of water conservation mandates.

CONCLUSIONS

Based on the information gathered during this survey, the most significant problems with the sanitary sewer for Randolph Air Force Base include infiltration/inflow, high COD, and the presence of metals in the wastewater. The COD levels in the base effluent were at no time during this survey above the IWO limit. Some potential sources of high COD include NDI operations, food preparation facilities, and washrack wastewater. The IWO limit of 625 mg/L is lower than what is considered medium strength domestic waste, and there will likely be occasional exceedances of this limit that are unavoidable and unattributable to industrial operations.

Rainfall and sewer flow data indicate a significant problem with infiltration and inflow to the sanitary sewer. This problem is costing RAFB more than the occasional COD limit violations, especially during years of above average rainfall. This problem also poses a more significant threat to WWTP operations, and is considered more important than the COD violations to the CCMA staff.

The IWO limits for metals are unreasonably low, and it is likely that many of the values should be in mg/L rather than ug/L. With the limits set as they are now, RAFB will always violate several of them.

RECOMMENDATIONS

Stormwater Infiltration/Inflow

The most costly problem for RAFB is the infiltration/inflow problem with the sanitary sewers. Rainwater should be prevented from entering the sanitary sewer wherever feasible. Connections between the storm and sanitary sewers should be eliminated wherever possible, including OWSs and deteriorating manholes and sewer lines. Washracks should be covered, and the surrounding apron areas sloped away from the washrack drains.

Decrepit sewer lines and manholes should be repaired or replaced. Lackland AFB has a "Reveal and Seal" team that will send a video camera through sewer lines to detect breakages. Armstrong Laboratory has both in-house and contract capabilities for detecting infiltration/inflow problems and locations.

High COD Levels

RAFB should request that the NDI facility increase the time allowed for products to drip the dye compounds before they are rinsed. Food preparation facilities should eliminate as much solid food disposal to the sanitary sewer as possible. The grease trap outside of the Burger Bar needs to be repaired to prevent oils and greases from entering the sewer. RAFB should send a split sample of the water collected by CCMA for a COD sample to Armstrong Laboratory, or another certified laboratory for comparative analysis.

Metals

Of great importance to RAFB should be reviewing and amending the effluent limits for metals in the IWO. RAFB should strive to reduce individual metals contamination as much as possible. For example, one possible source of molybdenum is in a corrosion inhibiting product, sodium molybdate, often used in cooling towers. RAFB should investigate use of this product, and substitute an alternate corrosion inhibitor.

OWS Operation and Maintenance

As indicated in the section above, shops using OWSs should enforce procedures to minimize and eliminate oil from entering the wastewater stream wherever possible. Procedures for doing this include the use of drip pans and absorbents to capture the oils, greases, and fuels, rather than washing it off. Also, the use of detergents and solvents should be minimized. A proper OWS should be installed at the Refueling Truck Maintenance shop, and the OWSs at Vehicle Maintenance should be properly serviced, and perhaps replaced or rerouted to a larger OWS. The OWS at the new hush house needs to be serviced, and placed on the routine maintenance contract.

IWO Compliance

Besides the recommendations above for COD and Metals, RAFB does not appear to have other significant problems with the base effluent. The detection of Lindane in the North sewer lines on one day might be reason for RAFB to review the pesticides operations and management procedures to insure that these compounds are not being introduced into the sanitary sewer.

Water Conservation

RAFB should implement a program to encourage water conservation, and minimize daytime sprinkler watering. As a rule of thumb, grass does not need to be watered if it "bounces back" when one steps on it. Sprinkler watering should be conducted before 1000 hours or after 2000 hours.

General Recommendations

RAFB should update their G-2 and G-3 base maps to reflect the actual systems in place. Updated maps are essential for emergency response. Included in updating these maps should be the numbering of all manholes, so that they can be quickly identified by emergency response and maintenance personnel. The G-5 map locating OWSs also needs to be updated.

REFERENCES

1. Binovi, Robert D. USAFOEHL REPORT 85-164EQ163KSC, Randolph Wastewater Study, Randolph AFB TX, (October 1985).

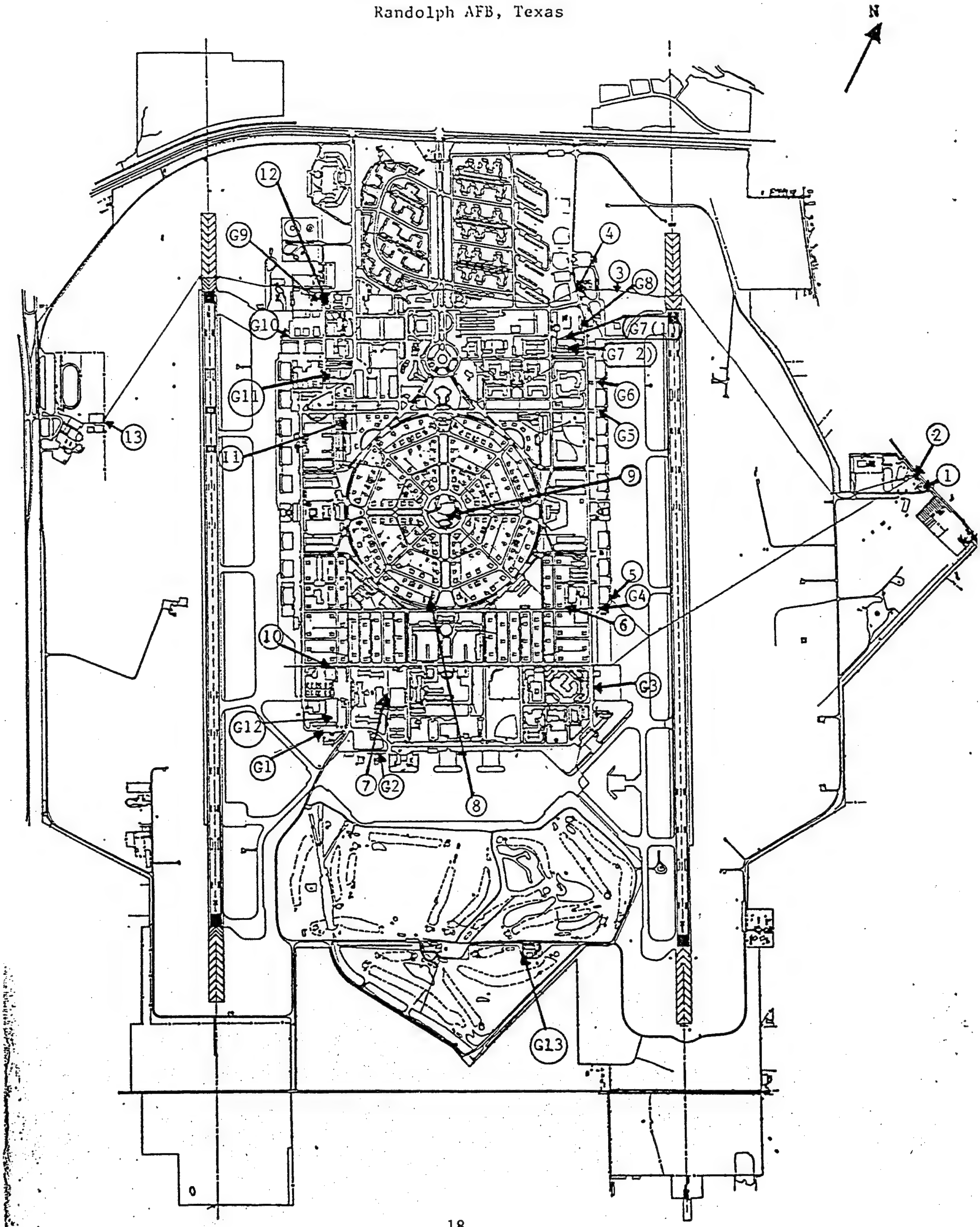
2. Geo-Marine, Inc. Phase II Preliminary Evaluation of Air Force Base Wastewater Treatment Systems; Randolph Air Force Base, (September 1994).

3. Cibolo Creek Municipal Authority. Industrial Waste Order, Board of Directors Order 1991-1, (February 1991).

APPENDIX A

Site Location Map

SITE LOCATION MAP
Randolph AFB, Texas



APPENDIX B

Complete Analytical Results

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

BASE EFFLUENT

	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	**FRI, 12 MAY 1995**	**SAT, 13 MAY 1995**	**SUN, 14 MAY 1995**	**MON, 15 MAY 1995**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THU, 18 MAY 95**
Chemical Oxygen Demand	218	338	407	371	284	379	269/407*
Oil and Grease	912	56	99.2	41.2	92	68	53.6/60.8*
Total Petroleum Hydrocarbon	848	28.8	8.2	7.2	14.4	44	27.2/36.4*
5 Day Biological Oxygen Demand	265	252	Not Accomplished	Not Accomplished	>600 Insufficent dissolved oxygen after 5 days		
GROUP D ANALYTES (mg/L)							
Cyanide	0.005	0.006	0.006	<0.005	0.012	0.006	0.006/0.008*
GROUP E ANALYTES (ug/L)							
Phenols	66	111	44	73	63	37	60/40*
GROUP F ANALYTES (mg/L)							
Aluminum	2.62	0.94	4.71	4.94	3.27	4.64	3.65/6.59*
Antimony	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.015/<0.006*
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010/<0.010*
Barium	0.183	0.115	0.252	0.257	0.245	0.341	0.306/0.537*
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004/<0.004*
Cadmium	0.004	0.003	0.004	0.003	0.001	0.002	0.002/0.003*
Total Chromium	<0.010	<0.010	0.01	0.017	<0.010	0.011	0.011/0.027*
Cobalt	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050/<0.050*
Copper	0.158	0.097	0.23	0.189	0.052	0.279	0.256/0.443*
Iron	1.26	0.428	1.79	1.98	1.43	2.63	3.12/7.61*
Lead	0.035	0.008	0.029	0.045	0.026	0.044	0.049/0.081*
Manganese	0.034	<0.030	0.03	0.036	<0.030	0.04	0.034/0.060*
Mercury	0.0006	<0.0002	0.0006	0.003	<0.0002	0.0006	0.004/0.002*
Molybdenum	<0.030	<0.030	<0.030	<0.030	<0.030	0.033	0.037/0.043*
Nickel	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030/0.074*
Selenium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010/<0.010*
Silver	0.02	<0.010	0.012	0.016	<0.010	0.018	0.025/0.063*
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002/<0.002*
Titanium	<0.050	<0.050	0.085	<0.050	<0.050	<0.050	<0.050/<0.050*
Vanadium	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050/<0.050*
Zinc	0.208	0.1	0.291	0.28	0.238	0.396	0.354/0.676*
Group G (mg/L)							
Total Dissolved Solids (TDS)	444	850	510	408	464	625	420/340*
ON SITE ANALYSES							
pH (units)	6.8	6.8	6.8	6.2	7	6.5	6.5
Temperature (°F)	65	66	64	66	72		72
SAMPLE NUMBERS	CN950220	CN950230	CN950233	CN950236,CN950237	CN950240,CN950241	CN950245	CN950263/CN950254*
							CN950262/CN950253*
EPA METHOD 8021	**COLLECTION DATE**	**COLLECTION DATE**	**COLLECTION DATE**	**COLLECTION DATE**	**COLLECTION DATE**	**COLLECTION DATE**	**COLLECTION DATE**
VOLATILE COMPOUNDS (ug/L)	**FRI, 12 MAY 1995**	**SAT, 13 MAY 1995**	**SUN, 14 MAY 1995**	**MON, 15 MAY 1995**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THU, 18 MAY 95**
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Benzyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Bromobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Bromodichloromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Bromoform	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Bromomethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Carbon tetrachloride	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chlorodibromomethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chloroform	<1.0	<1.0	1.12	1.28	<1.0	<2	<1.0<2*
2-Chlorethylvinyl Ether	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chloromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Chlorodibromomethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Dibromomethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,2-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,3-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,4-Dichlorobenzene	1.78	2.4	1.4	1.34	2.7	<2	1.81/1.93*
Dichlorodifluoromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,1-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Trans-1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,2-Dichloropropane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Cis-1,3-Dichloropropene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Trans-1,3-Dichloropropene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Ethyl Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Methylene Chloride	<1.0	<1.0	33.75	<1.0	<1.0	<2	<1.0<2*
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Tetrachloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Toluene	2	3.13	2.3	1.4	1.2	1.8	19.1/20.1*
1,1,1-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,1,2-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Trichloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Trichlorofluoromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
1,2,3-Trichloropropane	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
Vinyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
o-Xylene	3	10.16	3.4	<1.0	<1.0	<2	<1.0<2*
m-Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
p-Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<2	<1.0<2*
SAMPLE NUMBER	GN950221	GN950229	GN940934	GN950238	GN950242	GN950246	GN950264/GN950255*

*Duplicate Sample Results

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

BASE EFFLUENT

EPA METHOD 606/625 (ug/L)	COLLECTION DATE FRI, 12 MAY 1995	COLLECTION DATE SAT, 13 MAY 1995	COLLECTION DATE SUN, 14 MAY 1995	COLLECTION DATE MON, 15 MAY 1995	COLLECTION DATE TUES, 16 MAY 95	COLLECTION DATE WED, 17 MAY 95	COLLECTION DATE THU, 18 MAY 95
Acenaphthene	<10	<10	<10	<10	<10	<10	<10/<10*
Acenaphthylene	<10	<10	<10	<10	<10	<10	<10/<10*
Anthracene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzidine	<50	<50	<50	<50	<50	<50	<50/<50*
Benzo(a)anthracene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzo(b)fluoranthene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzo(k)fluoranthene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzo(a)pyrene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzo(ghi)perylene	<10	<10	<10	<10	<10	<10	<10/<10*
Benzyl butyl phthalate	<10	<10	<10	<10	<10	<10	<10/<10*
Bis(2-chloroethyl)ether	<10	<10	<10	<10	<10	<10	<10/<10*
Bis(2-chloroethoxy)methane	<10	<10	<10	<10	<10	<10	<10/<10*
Bis(2-ethylhexyl)phthalate	150	12	57	51	65	60	100-520/112-120*
Bis(2-chloroisopropyl)ether	<10	<10	<10	<10	<10	<10	<10/<10*
4-Bromophenyl phenyl ether	<10	<10	<10	<10	<10	<10	<10/<10*
2-Chloronaphthalene	<10	<10	<10	<10	<10	<10	<10/<10*
4-Chlorophenyl phenyl ether	<10	<10	<10	<10	<10	<10	<10/<10*
Chrysene	<10	<10	<10	<10	<10	<10	<10/<10*
Dibenzo(a,h)anthracene	<10	<10	<10	<10	<10	<10	<10/<10*
Di-n-butylphthalate	<10	<10	<10	<10	<10	14	<10/<10*
1,2-Dichlorobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
1,3-Dichlorobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
1,4-Dichlorobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
3,3-Dichlorobenzidine	<20	<20	<20	<20	<20	<20	<20/<20*
Diethyl phthalate	14	12	15	17	14	16	18/17-18*
Dimethyl phthalate	<10	<10	<10	<10	<10	<10	<10/<10*
2,4-Dinitrotoluene	<10	<10	<10	<10	<10	<10	<10/<10*
2,6-Dinitrotoluene	<10	<10	<10	<10	<10	<10	<10/<10*
Di-n--octyl phthalate	<10	<10	<10	<10	<10	<10	<10/<10*
Fluoranthene	<10	<10	<10	<10	<10	<10	<10/<10*
Fluorene	<10	<10	<10	<10	<10	<10	<10/<10*
Hexachlorobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
Hexachlorobutadiene	<10	<10	<10	<10	<10	<10	<10/<10*
Hexachlorocyclopentadiene	<10	<10	<10	<10	<10	<10	<10/<10*
Hexachloroethane	<10	<10	<10	<10	<10	<10	<10/<10*
Indeno(1,2,3-cd)pyrene	<10	<10	<10	<10	<10	<10	<10/<10*
Isophorone	<10	<10	<10	<10	<10	<10	<10/<10*
Naphthalene	<10	<10	<10	<10	<10	<10	<10/<10*
Nitrobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
N-Nitrosodimethylamine	<10	<10	<10	<10	<10	<10	<10/<10*
N-Nitrosodi-n-propylamine	<10	<10	<10	<10	<10	<10	<10/<10*
N-Nitrosodiphenylamine	<10	<10	<10	<10	<10	<10	<10/<10*
Phenanthrene	<10	<10	<10	<10	<10	<10	<10/<10*
Pyrene	<10	<10	<10	<10	<10	<10	<10/<10*
1,2,4-Trichlorobenzene	<10	<10	<10	<10	<10	<10	<10/<10*
4-Chloro-3-methylphenol	<10	<10	<10	<10	<10	<10	<10/<10*
2-Chlorophenol	<10	<10	<10	<10	<10	<10	<10/<10*
2,4-Dichlorophenol	<10	<10	<10	<10	<10	<10	<10/<10*
2,4-Dimethylphenol	<10	<10	<10	<10	<10	<10	<10/<10*
2,4-Dinitrophenol	<50	<50	<50	<50	<50	<50	<50/<50*
2-Methyl-4,6-dinitrophenol	<50	<50	<50	<50	<50	<50	<50/<50*
2-Nitrophenol	<10	<10	<10	<10	<10	<10	<10/<10*
4-Nitrophenol	<50	<50	<50	<50	<50	<50	<50/<50*
Pentachlorophenol	<50	<50	<50	<50	<50	<50	<50/<50*
Phenol	26	17	35	42	<10	20	<10/<10*
2,4,6-Trichlorophenol	<10	<10	<10	<10	<10	<10	<10/<10*
SAMPLE NUMBER	GN950222	GN950231	GN950235	GN950239	GN950243	GN950247	GN950250/GN950265
	GN950225						GN950256*/GN950259*

* Duplicate Sample Results

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

BASE EFFLUENT

EPA METHOD 615 (ug/L)	COLLECTION DAT FRI, 12 MAY 1995	COLLECTION DAT THU, 18 MAY 95	COLLECTION DATE THU, 18 MAY 95
2,4-D	<1.2	<1.2	<1.2*
2,4-DB	<0.91	<0.91	<0.91*
Dalapon	<5.8	<5.8	<5.8*
Dicamba	<0.27	<0.27	<0.27*
Dichloroprop	<0.65	<0.65	<0.65*
Dinoseb	<0.07	<0.07	<0.07*
MCPA	<249	<249	<249*
MCPP	<192	<192	<192*
Silvex	<0.17	<0.17	<0.17*
2,4,5-T	<0.20	<0.2	<0.2*
SAMPLE NUMBERS	GN950227	GN950252	GN950261*

EPA METHOD 624 VOLATILE COMPOUNDS (ug/L)	COLLECTION DAT FRI, 12 MAY 1995	COLLECTION DAT THU, 18 MAY 95	COLLECTION DAT THU, 18 MAY 95
Benzene	<5	<5	<5*
Benzyl Chloride	<5	<5	<5*
Bromobenzene	<5	<5	<5*
Bromodichloromethane	<5	<5	<5*
Bromoform	<5	<5	<5*
Bromomethane	<5	<5	<5*
Carbon tetrachloride	<5	<5	<5*
Chlorobenzene	<5	<5	<5*
Chlorodibromomethane	<5	<5	<5*
Chloroethane	<5	<5	<5*
Chloroform	<5	<5	<5*
2-Chlorethylvinyl Ether	<5	<5	<5*
Chloromethane	<5	<5	<5*
Chlorodibromomethane	<5	<5	<5*
Dibromomethane	<5	<5	<5*
1,2-Dichlorobenzene	<5	<5	<5*
1,3-Dichlorobenzene	<5	<5	<5*
1,4-Dichlorobenzene	<5	<5	<5*
Dichlorodifluoromethane	<5	<5	<5*
1,1-Dichloroethane	<5	<5	<5*
1,2-Dichloroethane	<5	<5	<5*
1,1-Dichloroethene	<5	<5	<5*
Trans-1,2-Dichloroethene	<5	<5	<5*
1,2-Dichloropropane	<5	<5	<5*
Cis-1,3-Dichloropropene	<5	<5	<5*
Trans-1,3-Dichloropropene	<5	<5	<5*
Ethyl Benzene	<5	<5	<5*
Methylene Chloride	<5	<5	<5*
1,1,1,2-Tetrachloroethane	<5	<5	<5*
1,1,2,2-Tetrachloroethane	<5	<5	<5*
Tetrachloroethylene	<5	<5	<5*
Toluene	<5	20.4	26.8*
1,1,1-Trichloroethane	<5	<5	<5*
1,1,2-Trichloroethane	<5	<5	<5*
Trichloroethylene	<5	<5	<5*
Trichlorofluoromethane	<5	<5	<5*
1,2,3-Trichloropropane	<5	<5	<5*
Vinyl Chloride	<5	<5	<5*
o-Xylene	<5	<5	<5*
m-Xylene	<5	<5	<5*
p-Xylene	<5	<5	<5*
SAMPLE NUMBER	GN950224	GN950249	GN950258

EPA METHOD 608 (ug/L)	COLLECTION DAT SAT, 13 MAY 1995	COLLECTION DAT THU, 18 MAY 95	COLLECTION DAT THU, 18 MAY 95
Heptachlor Epoxide	<4.2	<4.15	<4.15*
Aldrin	<0.20	<0.20	<0.20*
alpha-BHC	<0.15	<0.15	<0.15*
beta-BHC	<0.3	<0.30	<0.30*
delta-BHC	<0.45	<0.45	<0.45*
Lindane (gamma-BHC)	<0.15	<0.15	<0.15*
Chlordane	<0.7	<0.70	<0.70*
4,4' DDD	<0.55	<0.55	<0.55*
4,4' DDE	<0.20	<0.20	<0.20*
p,p-DDT	<0.60	<0.06	<0.06*
Dieldrin	<0.10	<0.10	<0.10*
Endosulfan I	<0.70	<0.7	<0.7*
Endosulfan II	<0.20	<0.2	<0.2*
Endosulfan Sulfate	<3.3	<3.30	<3.30*
Endrin	<0.30	<0.30	<0.30*
Endrin Aldehyde	<1.15	<1.15	<1.15*
Heptachlor	<0.15	<0.15	<0.15*
Texaphene	<5	<5	<5*
Aroclor 1016	<5	<5	<5*
Aroclor 1221	<5	<5	<5*
Aroclor 1232	<5	<5	<5*
Aroclor 1242	<3.3	<3.25	<3.25*
Aroclor 1248	<5	<5	<5*
Aroclor 1254	<5	<5	<5*
Aroclor 1260	<5	<5	<5*
SAMPLE NUMBER	GN950223	GN950248	GN950257*

*Duplicate Sample Results

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 10 MAY - 16 MAY 1995

O Club, Bowling Alley, High School and Burger Bar

	O Club			Bowling Alley		
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	**FRI, 12 MAY 1995**	**SAT, 13 MAY 1995**	**SUN, 14 MAY 1995**	**FRI, 12 MAY 1995**	**SAT, 13 MAY 1995**	**SUN, 14 MAY 1995**
Chemical Oxygen Demand	254	381	710	237	370	366
Oil and Grease	55.2	17.76	17.4	64.8	143.2	244
5 Day Biological Oxygen Demand	168	319	Not Accomplished			
Group G (mg/L)						
Total Dissolved Solids (TDS)	461	321	986	756	1336	1208
ON SITE ANALYSES						
pH (units)	7.2	7	6.8	6.8	6.4	6.8
Temperature (°F)	82	68	104	62	63	67
SAMPLE NUMBERS	CN950213	CN950214	CN950215	CN950216	CN950217	CN950218

	HIGH SCHOOL RESULT			Burger Bar		
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**
Chemical Oxygen Demand	191	156	422	174	237	276
Oil and Grease	19.6	8.56	38.2	15.2	34.4	300.8
GROUP E ANALYTES (ug/L)						
Phenols	37	34	17	Not Requested	Not Requested	Not Requested
GROUP F ANALYTES (mg/L)						
Aluminum	0.303	0.08	0.223			
Antimony	<0.006	<0.006	<0.006			
Arsenic	<0.010	<0.010	<0.010			
Barium	0.116	0.12	0.104			
Beryllium	<0.004	<0.004	<0.004			
Cadmium	<0.0001	<0.0001	<0.0001			
Total Chromium	<0.010	<0.010	0.016			
Cobalt	<0.050	<0.050	<0.050			
Copper	0.128	0.085	0.081			
Iron	0.506	0.362	0.528			
Lead	0.031	<0.020	0.115			
Manganese	<0.030	<0.030	<0.030			
Mercury	<0.0002	<0.0002	0.0005			
Molybdenum	<0.030	<0.030	<0.030			
Nickel	<0.030	<0.030	<0.030			
Selenium	<0.010	<0.010	<0.010			
Silver	<0.010	<0.010	<0.010			
Thallium	<0.002	<0.002	<0.002			
Titanium	<0.050	<0.050	<0.050			
Vanadium	<0.050	<0.050	<0.050			
Zinc	0.202	0.082	0.236			
Group G (mg/L)						
Total Dissolved Solids (TDS)	1024	488	832	572	612	412
ON SITE ANALYSES						
pH (units)	7	6.5	7	7	7	7
Temperature (°C)	68		64	69		64
SAMPLE NUMBERS	CN950289, CN950290	CN950291,CN950292	CN950293,CN950294	CN950266	CN950267	CN950268

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

Officer & North Housing, Dining Hall, NCO Club & Housing Maintenance

	OFFICER HOUSING AREA			NORTH HOUSING AREA		
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	FRI, 12 MAY 95	SAT, 13 MAY 95	SUN, 14 MAY 95	FRI, 12 MAY 95	SAT, 13 MAY 95	SUN, 14 MAY 95
Chemical Oxygen Demand	241	266	272	274	389	269
Oil and Grease	16.3	37.6	49.2	26.5	56.4	42.4
Total Petroleum Hydrocarbon	Not Requested	6.5	8.4	6.5	6.6	4.2
5 Day Biological Oxygen Demand	Not Accomplished	Not Accomplished	Not Accomplished	278	342	Not Accomplished
GROUP E ANALYTES (ug/L)						
Phenols	70	50	73	68	68	62
Group G (mg/L)						
Total Dissolved Solids (TDS)	388	468	506	506	904	500
ON SITE ANALYSES						
pH (units)	6.4	7.1	6.4	7.6	7.1	6.6
Temperature (°F)	64	62	62	65	68	66
SAMPLE NUMBERS	CN950210	CN950211	CN940212	CN950204	CN950205	CN950206

	NCO Club			Dining Hall		
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	FRI, 12 MAY 1995	SAT, 13 MAY 1995	SUN, 14 MAY 1995	FRI, 12 MAY 1995	SAT, 13 MAY 1995	MON, 15 MAY 1995
Chemical Oxygen Demand	246	339	289	620/720*	2000	360
Oil and Grease	26.7	11.3	23.8	64.8/56*	148	528
GROUP E ANALYTES (ug/L)						
Phenols	Not Requested	Not Requested	Not Requested	58/63*	40	29
Group G (mg/L)						
Total Dissolved Solids (TDS)	1169	336	2000	640/644*	490	720
ON SITE ANALYSES						
pH (units)	6.4	6.6	7.2	4.5	6.2	6.2
Temperature (°F)	64	63	70	67	79	78
SAMPLE NUMBERS	CN950207	CN950208	CN950209	CN950200/CN950201*	CN950202	CN950203

	Golf Course Maintenance*			Golf Course Maintenance*	
	COLLECTION DATE	COLLECTION DATE		COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	THU, 18 MAY 95	THU, 18 MAY 95	EPA METHOD 615 (ug/L)	THU, 18 MAY 95	THU, 18 MAY 95
Chemical Oxygen Demand	70	195	2,4-D	<1.2	<1.2
Oil and Grease	21.6	No Requested	2,4-DB	<0.91	<0.91
Total Petroleum Hydrocarbon	6.4	No Requested	Dalapon	<5.8	<5.8
			Dicamba	<0.27	<0.27
GROUP D ANALYTES (mg/L)			Dichloroprop	<0.65	<0.65
Cyanide	0.005	0.012	Dinoseb	<0.07	<0.07
			MCPA	<249	<249
GROUP E ANALYTES (ug/L)			MCPP	<192	<192
Phenols	<10	62	Silvex	<0.17	<0.17
			2,4,5-T	<0.2	<0.2
GROUP F ANALYTES (mg/L)					
Aluminum	0.176	1.56	SAMPLE NUMBER	GN950385	GN950387
Antimony	<0.006	0.008			
Arsenic	<0.010	<0.010	EPA METHOD 608 (ug/L)		
Barium	0.108	0.237			
Beryllium	<0.004	<0.004	Heptachlor Epoxide	<0.83	<0.83
Cadmium	<0.001	0.004	Aldrin	<0.04	<0.04
Total Chromium	<0.010	<0.010	alpha-BHC	<0.03	<0.03
Cobalt	<0.050	<0.050	beta-BHC	<0.06	<0.06
Copper	0.058	0.086	delta-BHC	<0.09	<0.09
Iron	0.723	3.15	Lindane (gamma-BHC)	<0.03	<0.03
Lead	<0.020	0.078	Chlordane	<0.14	<0.14
Manganese	0.031	0.131	4,4' DDD	<0.11	<0.11
Mercury	<0.0002	<0.0002	4,4' DDE	<0.04	<0.04
Molybdenum	<0.030	<0.030	p,p-DDT	<0.12	<0.12
Nickel	<0.030	<0.030	Dieldrin	<0.02	<0.02
Selenium	<0.010	<0.010	Endosulfan I	<0.14	<0.14
Silver	<0.010	<0.010	Endosulfan II	<0.04	<0.04
Thallium	<0.002	<0.002	Endosulfan Sulfate	<0.66	<0.66
Titanium	<0.050	<0.050	Endrin	<0.06	<0.06
Vanadium	<0.050	<0.050	Endrin Aldehyde	<0.23	<0.23
Zinc	0.11	0.26	Heptachlor	<0.03	<0.03
			Texaphene	<1.0	<1.0
Group G (mg/L)			Aroclor 1016	<1.0	<1.0
Total Dissolved Solids (A55TDS)	294	288	Aroclor 1221	<1.0	<1.0
			Aroclor 1232	<1.0	<1.0
ON SITE ANALYSES			Aroclor 1242	<0.65	<0.65
pH (units)	7	7	Aroclor 1248	<1.0	<1.0
Temperature (°F)	61	61	Aroclor 1254	<1.0	<1.0
			Aroclor 1260	<1.0	<1.0
SAMPLE NUMBERS	GN950305,GN950501	GN950502			
			SAMPLE NUMBER	GN950306	GN950386

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

CLINIC AND NE FLIGHTLINE/PIZZA

	CLINIC RESULTS			NE FLIGHTLINE/PIZZA		
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**
Chemical Oxygen Demand	196	320	105/119*	338	399	385
Oil and Grease	1.44	8.4	7.5	10.8	14.4	37.6
Total Petroleum Hydrocarbon				8.8	13.6	21.2
GROUP D ANALYTES (mg/L)						
Cyanide	<0.005	<0.005	0.021	0.012	<0.005	0.008/007*
GROUP E ANALYTES (ug/L)						
Phenols	96	66	105/100*	Not Requested	Not Requested	Not Requested
GROUP F ANALYTES (mg/L)						
Aluminum	0.325	0.169	0.22	0.284	0.156	0.215
Antimony	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Barium	0.735	0.254	0.355	0.131	0.135	0.126
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cadmium	<0.0001	<0.0001	<0.0001	0.006	0.002	0.008
Total Chromium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cobalt	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Copper	0.122	0.116	0.214	0.098	0.091	0.103
Iron	0.533	0.521	0.803	0.635	4.99	0.675
Lead	<0.020	<0.020	0.016	<0.020	<0.020	0.023
Manganese	<0.030	<0.030	<0.030	0.032	0.04	0.03
Mercury	0.0007	0.0006	0.005	<0.0002	<0.0002	0.0002
Molybdenum	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Nickel	<0.030	<0.010	<0.030	<0.030	0.044	<0.030
Selenium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver	0.02	0.072	0.167	<0.010	0.028	0.052
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vanadium	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	0.094	0.154	0.261	0.202	0.13	0.133
Group G (mg/L)						
Total Dissolved Solids (TDS)	560	460	452	4776	436	
ON SITE ANALYSES						
pH (units)	7	7	7	7	7	7
Temperature (°C)	69		63	70		65
SAMPLE NUMBERS	CN950295, CN950296	CN950298, CN950299	CN950302 CN950304*	CN950279,CN950280	CN950282,CN950283	CN950286,CN940287
			CN950301			CN950285*
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**THUR, 18 MAY 95**
Benzene	<1.0	<50	<20	<1.0	<50	<2
Benzyl Chloride	<1.0	<50	<2	<1.0	<50	<2
Bromobenzene	<1.0	<50	<2	<1.0	<50	<2
Bromodichloromethane	<1.0	<50	<2	<1.0	<50	<2
Bromoform	<1.0	<50	<2	<1.0	<50	1.97
Bromomethane	<1.0	<50	<2	<1.0	<50	<2
Carbon tetrachloride	<1.0	<50	<2	<1.0	<50	<2
Chlorobenzene	<1.0	<50	<2	<1.0	<50	<2
Chlorodibromomethane	<1.0	<50	<2	<1.0	<50	<2
Chloroethane	<1.0	<50	<2	<1.0	<50	<2
Chloroform	<1.0	<50	<2	<1.0	<50	<2
2-Chlorethylvinyl Ether	<1.0	<50	<2	<1.0	<50	<2
Chloromethane	<1.0	<50	<2	<1.0	<50	<2
Chlorodibromomethane	<1.0	<50	<2	<1.0	<50	<2
Dibromomethane	<1.0	<50	<2	<1.0	<50	<2
1,2-Dichlorobenzene	<1.0	<50	<2	<1.0	<50	<2
1,3-Dichlorobenzene	<1.0	<50	<2	<1.0	<50	<2
1,4-Dichlorobenzene	<1.0	<50	<2	<1.0	<50	<2
Dichlorodifluoromethane	<1.0	<50	<2	<1.0	<50	<2
1,1-Dichloroethane	<1.0	<50	<2	<1.0	<50	<2
1,2-Dichloroethane	<1.0	<50	<2	<1.0	<50	<2
1,1-Dichloroethene	<1.0	<50	<2	<1.0	<50	<2
Trans-1,2-Dichloroethene	<1.0	<50	<2	<1.0	<50	<2
1,2-Dichloropropane	<1.0	<50	<2	<1.0	<50	<2
Cis-1,3-Dichloropropene	<1.0	<50	<2	<1.0	<50	<2
Trans-1,3-Dichloropropene	<1.0	<50	<2	<1.0	<50	<2
Ethyl Benzene	<1.0	<50	<20	<1.0	<50	<2
Methylene Chloride	<1.0	<50	<2	<1.0	<50	<2
1,1,1,2-Tetrachloroethane	<1.0	<50	<2	<1.0	<50	<2
1,1,2,2-Tetrachloroethane	<1.0	<50	<2	<1.0	<50	<2
Tetrachloroethylene	<1.0	<50	<2	<1.0	<50	<2
Toluene	<1.0	<50	<20	<1.0	<50	14.3
1,1,1-Trichloroethane	<1.0	<50	<2	<1.0	<50	<2
1,1,2-Trichloroethane	<1.0	<50	<2	<1.0	<50	<2
Trichloroethylene	<1.0	<50	<2	<1.0	<50	<2
Trichlorofluoromethane	<1.0	<50	<2	<1.0	<50	<2
1,2,3-Trichloropropane	<1.0	<50	<2	<1.0	<50	<2
Vinyl Chloride	<1.0	<50	<2	<1.0	<50	<2
o-Xylene	<1.0	<50	<20	<1.0	<50	<2
m-Xylene	<1.0	<50	<20	<1.0	<50	<2
p-Xylene	<1.0	<50	<20	<1.0	<50	<2
SAMPLE NUMBER	GN950297	GN950300	GN950303	GN950281	GN950284	GN950288

*Duplicate Sample Results

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

North and South Sewer Lines

	South Side Sewer		North Side Sewer	
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**
Chemical Oxygen Demand	318	259	234	318
5 Day Biological Oxygen Demand	226	Not Accomplished	298	Not Accomplished
SAMPLE NUMBERS	CN950277	CN950278	CN950272	CN950273
EPA 608 TTO (ug/L)				
Aldrin	<0.04	<0.04	<0.04	<0.04
alpha-BHC	<0.03	<0.03	<0.03	<0.03
beta-BHC	<0.06	<0.06	<0.06	<0.06
delta-BHC	<0.09	<0.09	<0.09	<0.09
Lindane (gamma-BHC)	<0.03	<0.03	<0.03	0.12
Chlordane	<0.14	<0.14	<0.14	<0.14
4,4'DDD	<0.11	<0.11	<0.11	<0.11
4,4'DDE	<0.04	<0.04	<0.04	<0.04
p,p-DDT	<0.12	<0.12	<0.12	<0.12
Dieldrin	<0.02	<0.02	<0.02	<0.02
Endosulfan I	<0.14	<0.14	<0.14	<0.14
Endosulfan II	<0.04	<0.04	<0.04	<0.04
Endosulfan Sulfate	<0.66	<0.66	<0.66	<0.66
Endrin	<0.06	<0.06	<0.06	<0.06
Endrin Aldehyde	<0.23	<0.23	<0.23	<0.23
Heptachlor	<0.03	<0.03	<0.03	<0.03
Heptachlor Epoxide	<0.83	<0.83	<0.83	<0.83
Toxaphene	<1	<1	<1	<1
Aroclor 1016	<1	<1	<1	<1
Aroclor 1221	<1	<1	<1	<1
Aroclor 1232	<1	<1	<1	<1
Aroclor 1242	<0.65	<0.65	<0.65	<0.65
Aroclor 1248	<1	<1	<1	<1
Aroclor 1254	<1	<1	<1	<1
Aroclor 1260	<1	<1	<1	<1
ON SITE ANALYSES				
pH (units)	7	6.5	7	6.5
Temperature (°F)	72		72	
SAMPLE NUMBERS	GN950274	GN950518	GN950269	GN950251
EPA METHOD 624	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	**TUES, 16 MAY 95**	**WED, 17 MAY 95**	**TUES, 16 MAY 95**	**WED, 17 MAY 95**
Benzene	<5	<5	<5	<5
Benzyl Chloride	<5	<5	<5	<5
Bromobenzene	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chlorodibromomethane	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5
2-Chlorethylvinyl Ether	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5
Chlorodibromomethane	<5	<5	<5	<5
Dibromomethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	8.3	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5
Trans-1,2-Dichloroethene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
Cis-1,3-Dichloropropene	<5	<5	<5	<5
Trans-1,3-Dichloropropene	<5	<5	<5	<5
Ethyl Benzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	7.9	8.1
1,1,1-Trichloroethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	<5	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5	<5
1,2,3-Trichloropropane	<5	<5	<5	<5
Vinyl Chloride	<5	<5	<5	<5
o-Xylene	<5	<5	3.4	<5
m-Xylene	<5	<5	<5	<5
p-Xylene	<5	<5	<5	<5
SAMPLE NUMBER	GN950275	GN950519	GN950270	GN950260

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

North and South Sewer Lines

	South Side Sewer		North Side Sewer	
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
EPA METHOD 606/625 (ug/L)	TUES, 16 MAY 95	WED, 17 MAY 95	TUES, 16 MAY 95	WED, 17 MAY 95
Acenaphthene	<10	<10	<10	<10
Acenaphthylene	<10	<10	<10	<10
Anthracene	<10	<10	<10	<10
Benzidine	<50	<50	<50	<50
Benzo(a)anthracene	<10	<10	<10	<10
Benzo(b)fluoranthene	<10	<10	<10	<10
Benzo(k)fluoranthene	<10	<10	<10	<10
Benzo(a)pyrene	<10	<10	<10	<10
Benzo(ghi)perylene	<10	<10	<10	<10
Benzyl butyl phthalate	<10	<10	<10	<10
Bis(2-chloroethyl)ether	<10	<10	<10	<10
Bis(2-chloroethoxy)methane	<10	<10	<10	<10
Bis(2-ethylhexyl)phthalate	20	11	10	12
Bis(2-chloroisopropyl)ether	<10	<10	<10	<10
4-Bromophenyl phenyl ether	<10	<10	<10	<10
2-Chloronaphthalene	<10	<10	<10	<10
4-Chlorophenyl phenyl ether	<10	<10	<10	<10
Chrysene	<10	<10	<10	<10
Dibenzo(a,h)anthracene	<10	<10	<10	<10
Di-n-butylphthalate	<10	14	<10	<10
1,2-Dichlorobenzene	<10	<10	<10	<10
1,3-Dichlorobenzene	<10	<10	<10	<10
1,4-Dichlorobenzene	<10	<10	<10	<10
3,3-Dichlorobenzidine	<20	<20	<20	<20
Diethyl phthalate	10	16	40	21
Dimethyl phthalate	<10	<10	<10	<10
2,4-Dinitrotoluene	<10	<10	<10	<10
2,6-Dinitrotoluene	<10	<10	<10	<10
Di-n--octyl phthalate	<10	<10	<10	<10
Fluoranthene	<10	<10	<10	<10
Fluorene	<10	<10	<10	<10
Hexachlorobenzene	<10	<10	<10	<10
Hexachlorobutadiene	<10	<10	<10	<10
Hexachlorocyclopentadiene	<10	<10	<10	<10
Hexachloroethane	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene	<10	<10	<10	<10
Isophorone	<10	<10	<10	<10
Naphthalene	<10	<10	<10	<10
Nitrobenzene	<10	<10	<10	<10
N-Nitrosodimethylamine	<10	<10	<10	<10
N-Nitrosodi-n-propylamine	<10	<10	<10	<10
N-Nitrosodiphenylamine	<10	<10	<10	<10
Phenanthrene	<10	<10	<10	<10
Pyrene	<10	<10	<10	<10
1,2,4-Trichlorobenzene	<10	<10	<10	<10
4-Chloro-3-methylphenol	<10	<10	<10	<10
2-Chlorophenol	<10	<10	<10	<10
2,4-Dichlorophenol	<10	<10	<10	<10
2,4-Dimethylphenol	<10	<10	<10	<10
2,4-Dinitrophenol	<50	<50	<50	<50
2-Methyl-4,6-dinitrophenol	<50	<50	<50	<50
2-Nitrophenol	<10	<10	<10	<10
4-Nitrophenol	<50	<50	<50	<50
Pentachlorophenol	<50	<50	<50	<50
Phenol	<10	<10	10	17
2,4,6-Trichlorophenol	<10	<10	<10	<10
SAMPLE NUMBER	GN950276	GN950520	GN950271	GN950516

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

Arts & Crafts Lift Station, Corrosion Control and NDI

	Arts & Crafts Lift Station	Corrosion Control*		NDI
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	THU, 18 MAY 1995	THU, 18 MAY 1995	THU, 18 MAY 1995	THU, 18 MAY 1995
Chemical Oxygen Demand	530	262	Not Requested	9040
Oil and Grease	31.2	Not Requested	Not Requested	Not Requested
Total Petroleum Hydrocarbon	19.2	Not Requested	Not Requested	Not Requested
GROUP D ANALYTES (mg/L)				
Cyanide	Not Requested	Not Requested	Not Requested	<0.005
GROUP F ANALYTES (mg/L)				
Aluminum	0.557	0.048	0.037	0.032
Antimony	<0.006	<0.006	<0.006	<0.006
Arsenic	<0.010	<0.010	<0.010	0.03
Barium	0.206	0.159	0.173	0.157
Beryllium	<0.004	<0.004	<0.004	<0.004
Cadmium	0.001	<0.001	<0.001	<0.001
Total Chromium	<0.010	0.836	0.903	0.03
Cobalt	<0.050	<0.050	<0.050	<0.050
Copper	0.066	<0.020	<0.020	0.117
Iron	1.48	0.197	0.19	0.223
Lead	0.041	0.029	0.03	0.021
Manganese	0.089	<0.030	<0.030	<0.030
Mercury	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.030	<0.030	<0.030	<0.030
Nickel	<0.030	0.041	0.046	<0.030
Selenium	<0.010	<0.010	<0.010	<0.010
Silver	<0.010	<0.010	<0.010	<0.010
Thallium	<0.002	<0.002	<0.002	<0.002
Titanium	0.119	<0.050	<0.050	<0.050
Vanadium	<0.050	<0.050	<0.050	<0.050
Zinc	0.139	0.175	0.179	0.199
Group G (mg/L)				
Total Dissolved Solids (TDS)	1044	252	280	
1				
ON SITE ANALYSES				
pH (units)	6.5	7		7
Temperature (°F)	72	67		68
SAMPLE NUMBERS	GN950517,GN950521	GN950388,GN95038	GN950391,GN95039	GN950393,GN95039

NDI	COLLECTION DATE THU, 18 MAY 1995
EPA METHOD 606/625 (ug/L)	
Acenaphthene	<85/<130*
Acenaphthylene	<85/<130*
Anthracene	<85/<130*
Benzidine	<425/<650*
Benzo(a)anthracene	<85/<130*
Benzo(b)fluoranthene	<85/<130*
Benzo(k)fluoranthene	<85/<130*
Benzo(a)pyrene	<85/<130*
Benzo(ghi)perylene	<85/<130*
Benzyl butyl phthalate	<85/<130*
Bis(2-chloroethyl)ether	<85/<130*
Bis(2-chloroethoxy)methane	<85/<130*
Bis(2-ethylhexyl)phthalate	<85/<130*
Bis(2-chloroisopropyl)ether	<85/<130*
4-Bromophenyl phenyl ether	<85/<130*
2-Chloronaphthalene	<85/<130*
4-Chlorophenyl phenyl ether	<85/<130*
Chrysene	<85/<130*
Dibenzo(a,h)anthracene	<85/<130*
Di-n-butylphthalate	<85/<130*
1,2-Dichlorobenzene	<85/<130*
1,3-Dichlorobenzene	<85/<130*
1,4-Dichlorobenzene	<85/<130*
3,3-Dichlorobenzidine	<170/<260*
Diethyl phthalate	<85/<130*
Dimethyl phthalate	<85/<130*
2,4-Dinitrotoluene	<85/<130*
2,6-Dinitrotoluene	<85/<130*
Di-n--octyl phthalate	<85/<130*
Fluoranthene	<85/<130*
Fluorene	<85/<130*
Hexachlorobenzene	<85/<130*
Hexachlorobutadiene	<85/<130*
Hexachlorocyclopentadiene	<85/<130*
Hexachloroethane	<85/<130*
Indeno(1,2,3-cd)pyrene	<85/<130*
Isophorone	<85/<130*
Naphthalene	<85/<130*
Nitrobenzene	<85/<130*
N-Nitrosodimethylamine	<85/<130*
N-Nitrosodi-n-propylamine	<85/<130*
N-Nitrosodiphenylamine	<85/<130*
Phenanthrene	<85/<130*
Pyrene	<85/<130*
1,2,4-Trichlorobenzene	<85/<130*
4-Chloro-3-methylphenol	<85/<130*
2-Chlorophenol	<85/<130*
2,4-Dichlorophenol	<85/<130*
2,4-Dimethylphenol	<85/<130*
2,4-Dinitrophenol	<425/<650*
2-Methyl-4,6-dinitrophenol	<425/<650*
2-Nitrophenol	<85/<130*
4-Nitrophenol	<425/<650*
Pentachlorophenol	<425/<650*
Phenol	150/370*
2,4,6-Trichlorophenol	<85/<130*
SAMPLE NUMBER	GN950395/GN950396*

	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	THU, 18 MAY 1995	THU, 18 MAY 1995
Benzene	<1.0	<10
Benzyl Chloride	<1.0	<10
Bromobenzene	<1.0	<10
Bromodichloromethane	<1.0	<10
Bromoform	<1.0	<10
Bromomethane	<1.0	<10
Carbon tetrachloride	<1.0	<10
Chlorobenzene	<1.0	<10
Chlorodibromomethane	<1.0	<10
Chloroethane	<1.0	<10
Chloroform	<1.0	<10
2-Chlorethylvinyl Ether	<1.0	<10
Chloromethane	<1.0	<10
Chlorodibromomethane	<1.0	<10
Dibromomethane	<1.0	<10
1,2-Dichlorobenzene	<1.0	<10
1,3-Dichlorobenzene	<1.0	<10
1,4-Dichlorobenzene	<1.0	<10
Dichlorodifluoromethane	<1.0	<10
1,1-Dichloroethane	<1.0	<10
1,2-Dichloroethane	<1.0	<10
1,1-Dichloroethene	<1.0	<10
Trans-1,2-Dichloroethene	<1.0	<10
1,2-Dichloropropane	<1.0	<10
Cis-1,3-Dichloropropene	<1.0	<10
Trans-1,3-Dichloropropene	<1.0	<10
Ethyl Benzene	4.55	<10
Methylene Chloride	<1.0	<10
1,1,1,2-Tetrachloroethane	<1.0	<10
1,1,2,2-Tetrachloroethane	<1.0	<10
Tetrachloroethylene	<1.0	<10
Toluene	14.4	11.6
1,1,1-Trichloroethane	<1.0	<10
1,1,2-Trichloroethane	<1.0	<10
Trichloroethylene	<1.0	<10
Trichlorofluoromethane	<1.0	<10
1,2,3-Trichloropropane	<1.0	<10
Vinyl Chloride	<1.0	<10
o-Xylene	9.65	<10
m-Xylene	20	8.5
p-Xylene	*See Comment	<10
SAMPLE NUMBER	GN950515	GN950390

* Duplicate Site Sample

*See Comments: p-xylene is included in the sume of m-xylene

RANDOLPH AFB, TEXAS

OIL/WATER SEPARATOR SURVEY: 15 MAY - 16 MAY 1995

AUTO HOBBY SHOP AND BLDG 11662

	AUTO HOBBY INFLUENT	AUTO HOBBY EFFLUENT	DUPLICATE OF EFFLUENT	BLDG 11662 INFLUENT	BLDG 11662 EFFLUENT
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995
Chemical Oxygen Demand	4320	1330	1450	379	384
Oil and Grease	161.6	43.2	46.8	47.6	47.2
Total Petroleum Hydrocarbon	112.8	22.8	23.36	19.52	41.6
GROUP F ANALYTES (mg/L)					
Aluminum	2	1.56	1.28	0.131	0.265
Antimony	0.011	0.008	0.007	<0.006	<0.006
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010
Barium	0.43	0.237	0.224	0.053	0.066
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004
Cadmium	0.011	0.004	0.004	0.01	0.016
Total Chromium	0.018	<0.010	<0.010	0.062	0.105
Cobalt	<0.050	<0.050	<0.050	<0.050	<0.050
Copper	0.627	0.086	0.078	<0.020	0.026
Iron	6.78	3.15	2.91	1.29	1.91
Lead	0.736	0.078	0.071	0.012	0.025
Manganese	0.109	0.131	0.122	0.047	0.052
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	0.067	<0.030	<0.030	<0.030	<0.030
Nickel	<0.030	<0.030	<0.030	<0.030	<0.030
Selenium	<0.010	<0.010	<0.010	<0.010	<0.010
Silver	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	<0.050	<0.050	<0.050	<0.050	<0.050
Vanadium	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	2.09	0.26	0.245	0.162	0.244
Group G (mg/L)					
Total Dissolved Solids (TSS/TDS)	2160	2104	1828	872	180
Surfactants	7.8	26	20	6.2	7.6
ON SITE ANALYSES					
pH (units)	6.2	6	6	6.6	6.4
Temperature (°F)	74	74	74	72	72
SAMPLE NUMBERS	GN950583, GN950584	GN950586, GN950587	CN950589, GN950590	GN950592.GN950593	GN950595,GN950596
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995	MON, 15 MAY 1995
Benzene	<1.0	1.5	1.68	<1.0	<1.0
Benzyl Chloride	<1.0	<10	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<10	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<10	<1.0	<1.0	<1.0
Bromoform	<1.0	<10	<1.0	<1.0	<1.0
Bromomethane	<1.0	<10	<1.0	<1.0	<1.0
Carbon tetrachloride	<1.0	<10	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<10	<1.0	<1.0	<1.0
Chlorodibromomethane	<1.0	<10	<1.0	<1.0	<1.0
Chloroethane	1.5	<10	<1.0	<1.0	<1.0
Chloroform	<1.0	<10	<1.0	<1.0	<1.0
2-Chlorethylvinyl Ether	<1.0	<10	<1.0	<1.0	<1.0
Chloromethane	12.44	<10	<1.0	<1.0	<1.0
Chlorodibromomethane	<1.0	<10	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<10	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<10	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<10	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<1.0	<10	<1.0	<1.0	<1.0
Dichlorodifluoromethane	<1.0	<10	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<10	<1.0	<1.0	<1.0
1,2-Dichloroethane	<1.0	<10	<1.0	<1.0	<1.0
1,1-Dichloroethene	<1.0	<10	<1.0	1.74	1.64
Trans-1,2-Dichloroethene	<1.0	<10	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<10	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene	<1.0	<10	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene	<1.0	<10	<1.0	<1.0	<1.0
Ethyl Benzene	<1.0	10	12.7	<1.0	<1.0
Methylene Chloride	<1.0	<10	<1.0	4.1	2.5
1,1,1,2-Tetrachloroethane	<1.0	<10	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<10	<1.0	<1.0	<1.0
Tetrachloroethylene	<1.0	<10	<1.0	<1.0	<1.0
Toluene	<1.0	38.5	36.5	5.69	5.96
1,1,1-Trichloroethane	<1.0	<10	<1.0	2.1	1.88
1,1,2-Trichloroethane	<1.0	<10	<1.0	<1.0	<1.0
Trichloroethylene	<1.0	<10	<1.0	3.24	2.96
Trichlorofluoromethane	<1.0	<10	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<10	<1.0	<1.0	<1.0
Vinyl Chloride	<1.0	<10	<1.0	<1.0	<1.0
o-Xylene	<1.0	27.9	30.1	<1.0	29.2
m-Xylene	<1.0	*See Comments	*See Comments	*See Comments	*See Comments
p-Xylene	<1.0	54.8	52.2	25.2	25.1
SAMPLE NUMBER	GN950582	GN950585	GN950588	GN950591	GN950594

*p-xylene result is the sum of the m- and p- xylene coelutes

RANDOLPH AFB, TEXAS

OIL/WATER SEPARATOR SURVEY: 15 MAY - 16 MAY 1995

Vehicle Maintenance O/W Seperators and Washrack

	O/W 171#1 Influent	O/W 171#1 Effluent	O/W 171#2 Influent	O/W 171#2 Effluent	Washrack Influent	Washrack Effluent
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Chemical Oxygen Demand	322	321	7160	6840	219	96
Oil and Grease	16240	3392	54600	10720	21.92	137.6
Total Petroleum Hydrocarbon	15040	2720	36400	3600	10.88	33.6
GROUP F ANALYTES (mg/L)						
Aluminum	38	8.5	11	8.91	0.165	0.046
Antimony	0.024	0.01	0.013	0.009	<0.006	0.004
Arsenic	<0.010	<0.010	<0.010	0.035	0.02	0.021
Barium	8.1	3.05	1.14	0.623	0.136	0.097
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cadmium	0.47	0.094	0.123	0.049	0.002	<0.001
Total Chromium	1.12	0.468	0.337	0.087	<0.010	<0.010
Cobalt	0.062	<0.050	<0.050	<0.050	<0.050	<0.050
Copper	8.91	2.27	4.18	1.99	0.039	<0.020
Iron	8.63	26.6	54.5	62.8	0.551	0.228
Lead	8.86	2.7	4.87	3.76	<0.020	<0.020
Manganese	0.809	0.231	0.579	0.687	0.073	0.074
Mercury	<0.0002	<0.0002	0.0004	0.0003	<0.0002	<0.0002
Molybdenum	0.377	0.138	0.28	0.13	<0.030	<0.030
Nickel	0.384	0.299	0.518	0.511	<0.030	<0.030
Selenium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	0.379	0.105	0.172	0.113	<0.050	<0.050
Vanadium	0.097	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	17.5	5.89	12.1	4.71	0.158	0.175
Group G (mg/L)						
Total Dissolved Solids (TSS/TDS)	264	215	3920	1916	628	368
Surfactants	1.4	17	6	5	30	4
ON SITE ANALYSES						
pH (units)	7	7	5	4	7	7
Temperature (°F)	67	68	72	72	67	67
SAMPLE NUMBERS	GN950619,GN950620	GN950622,GN950623	GN950625,GN950626	GN950628,GN950629	GN950631,GN950632	GN950634,GN950635
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Benzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Benzyl Chloride	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Bromobenzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Bromodichloromethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Bromoform	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Bromomethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Carbon tetrachloride	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chlorobenzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chlorodibromomethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chloroform	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
2-Chlorethylvinyl Ether	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chloromethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Chlorodibromomethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Dibromomethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,2-Dichlorobenzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,3-Dichlorobenzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,4-Dichlorobenzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Dichlorodifluoromethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,1-Dichloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,2-Dichloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,1-Dichloroethene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Trans-1,2-Dichloroethene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,2-Dichloropropane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Cis-1,3-Dichloropropene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Trans-1,3-Dichloropropene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Ethyl Benzene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Methylene Chloride	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Tetrachloroethylene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Toluene	<500 dilution 1:500	<200 dilution 1:200	4680	6580	<1.0	<1.0
1,1,1-Trichloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,1,2-Trichloroethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Trichloroethylene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Trichlorofluoromethane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
1,2,3-Trichloropropane	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
Vinyl Chloride	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
o-Xylene	<500 dilution 1:500	<200 dilution 1:200	<1000 dilution 1:1000	<200 dilution 1:200	<1.0	<1.0
m-Xylene	<500 dilution 1:500	*See Comments	*See Comments	*See Comments	*See Comments	*See Comments
p-Xylene	<500 dilution 1:500	284	2840	3163	1.4	1.5
SAMPLE NUMBER	GN950618	GN950621	GN950624	GN950627**	GN950630	GN950633

*p-xylene results are the sum of both m- p-xylene.

**Ran 1-2 days after 14 day holding time had expired

RANDOLPH AFB, TEXAS

OIL/WATER SEPARATOR SURVEY: 15 MAY - 16 MAY 1995

T-38 Washrack, Refueling and AGE OW Seperators

	T-38 WR Influent	T-38 WR Effluent	T-38 WR Pit	Refueling O/W	AGE WR Influent	AGE WR Effluent
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Chemical Oxygen Demand	1340	760	3720	920	1320	890
Oil and Grease	43.6	160	164.8	1408	1424	224
Total Petroleum Hydrocarbon	11.28	37.76	110	Not requested	1232	64
GROUP F ANALYTES (mg/L)						
Aluminum	0.452	0.132	3.71	0.467	2.83	0.168
Antimony	<0.006	<0.006	0.02	0.009	0.011	<0.006
Arsenic	<0.010	<0.010	0.03	<0.010	<0.010	<0.010
Barium	0.089	0.083	0.207	0.101	0.343	0.156
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cadmium	0.042	0.022	0.269	0.004	0.08	0.017
Total Chromium	0.019	0.011	0.129	<0.010	0.058	<0.010
Cobalt	<0.050	<0.050	0.058	<0.050	<0.050	<0.050
Copper	0.148	0.071	1.79	0.042	0.375	0.023
Iron	0.836	0.429	3.95	1.34	5.55	1.45
Lead	0.042	0.03	0.206	0.028	0.35	0.024
Manganese	0.155	0.158	0.235	0.035	0.087	0.07
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.030	<0.030	0.05	<0.030	<0.030	<0.030
Nickel	<0.030	<0.030	0.169	<0.030	0.065	<0.030
Selenium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	0.053	<0.050	0.082	<0.050	<0.050	<0.050
Vanadium	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	0.287	0.157	0.796	0.283	1.17	0.104
Group G (mg/L)						
Total Dissolved Solids (TSS/TDS)	1105	755	2000	312	464	480
Surfactants	1	5	1	5	4.6	2.4
ON SITE ANALYSES						
pH (units)	7	6.5	9	6	7	7
Temperature (°F)	65	70	66	62	66	66
SAMPLE NUMBERS	GN950614	GN950617	GN950638	GN950611	GN950605	GN950608
	GN950613	GN950616	GN950637	GN950610	GN950604	GN950607
	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995	MON, 15 MAY 1995	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Benzene	<2	<2	<10	<500	<50	<20
Benzyl Chloride	<2	<2	<10	<500	<50	<20
Bromobenzene	<2	<2	<10	<500	<50	<20
Bromodichloromethane	<2	<2	<10	<500	<50	<20
Bromoform	<2	<2	<10	<500	<50	<20
Bromomethane	<2	<2	<10	<500	<50	<20
Carbon tetrachloride	<2	<2	<10	<500	<50	<20
Chlorobenzene	<2	<2	<10	<500	<50	<20
Chlorodibromomethane	<2	<2	<10	<500	<50	<20
Chloroethane	<2	<2	<10	<500	<50	<20
Chloroform	<2	<2	<10	<500	<50	<20
2-Chlorethylvinyl Ether	<2	<2	<10	<500	<50	<20
Chloromethane	<2	<2	<10	<500	<50	<20
Chlorodibromomethane	<2	<2	<10	<500	<50	<20
Dibromomethane	<2	<2	<10	<500	<50	<20
1,2-Dichlorobenzene	<2	<2	<10	<500	<50	<20
1,3-Dichlorobenzene	<2	<2	<10	<500	<50	<20
1,4-Dichlorobenzene	<2	<2	<10	<500	<50	<20
Dichlorodifluoromethane	<2	<2	<10	<500	<50	<20
1,1-Dichloroethane	<2	<2	<10	<500	<50	<20
1,2-Dichloroethane	<2	<2	<10	<500	<50	<20
1,1-Dichloroethene	<2	<2	<10	<500	<50	<20
Trans-1,2-Dichloroethene	<2	<2	<10	<500	<50	<20
1,2-Dichloropropane	<2	<2	<10	<500	<50	<20
Cis-1,3-Dichloropropene	<2	<2	<10	<500	<50	<20
Trans-1,3-Dichloropropene	<2	<2	<10	<500	<50	<20
Ethyl Benzene	<2	<2	<10	635	<50	<20
Methylene Chloride	<2	<2	<10	<500	<50	<20
1,1,1,2-Tetrachloroethane	<2	<2	<10	<500	<50	<20
1,1,2,2-Tetrachloroethane	<2	<2	<10	<500	<50	<20
Tetrachloroethylene	<2	<2	<10	<500	<50	<20
Toluene	2.6	2.8	<10	630	<50	<20
1,1,1-Trichloroethane	<2	<2	<10	<500	<50	<20
1,1,2-Trichloroethane	<2	<2	<10	<500	<50	<20
Trichloroethylene	<2	<2	<10	<500	<50	<20
Trichlorofluoromethane	<2	<2	<10	<500	<50	<20
1,2,3-Trichloropropane	<2	<2	<10	<500	<50	<20
Vinyl Chloride	<2	<2	<10	<500	<50	<20
o-Xylene	<2	2.4	<10	2400	<50	<20
m-Xylene	*See Comments	*See Comments	<10	*See Comments	<50	<20
p-Xylene	5.4	7	<10	4250	<50	<20
SAMPLE NUMBER	GN950612	GN950615	GN950636	GN950609	GN950603	GN950606

*p-xylene result is the sum of both m and p-xylene

RANDOLPH AFB, TEXAS

OIL WATER SEPARATOR SURVEY: 15 MAY - 16 MAY 1995

HOUSING MAINTENANCE

	Housing Mx Influent	Housing Mx Effluent
	COLLECTION DATE	COLLECTION DATE
GROUP A & B ANALYTES (mg/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Chemical Oxygen Demand	95	91
Oil and Grease	64.8	24.32
Total Petroleum Hydrocarbon	59.2	15
GROUP F ANALYTES (mg/L)		
Aluminum	0.346	0.315
Antimony	<0.0006	<0.0006
Arsenic	0.024	0.02
Barium	0.066	0.063
Beryllium	<0.004	<0.004
Cadmium	0.009	0.009
Total Chromium	0.072	0.038
Cobalt	<0.050	<0.050
Copper	0.055	0.044
Iron	0.399	0.466
Lead	0.05	0.054
Manganese	0.126	0.135
Mercury	<0.0002	<0.0002
Molybdenum	<0.030	<0.030
Nickel	<0.030	<0.030
Selenium	<0.010	<0.010
Silver	<0.010	<0.010
Thallium	<0.002	<0.002
Titanium	<0.050	<0.050
Vanadium	<0.050	<0.050
Zinc	0.044	0.108
Group G (mg/L)		
Total Dissolved Solids (TDS)	488	458
Surfactants	6	5
ON SITE ANALYSES		
pH (units)	6.5	6.5
Temperature (°F)	66	65
SAMPLE NUMBERS	GN950641, GN950641	GN950645, GN950646
	COLLECTION DATE	COLLECTION DATE
VOLATILE COMPOUNDS (ug/L)	TUE, 16 MAY 1995	TUE, 16 MAY 1995
Benzene	<1.0	<1.0
Benzyl Chloride	<1.0	<1.0
Bromobenzene	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0
Bromoform	<1.0	<1.0
Bromomethane	<1.0	<1.0
Carbon tetrachloride	<1.0	<1.0
Chlorobenzene	<1.0	<1.0
Chlorodibromomethane	<1.0	<1.0
Chloroethane	<1.0	<1.0
Chloroform	<1.0	<1.0
2-Chlorethylvinyl Ether	<1.0	<1.0
Chloromethane	<1.0	<1.0
Chlorodibromomethane	<1.0	<1.0
Dibromomethane	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0
1,4-Dichlorobenzene	<1.0	<1.0
Dichlorodifluoromethane	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0
1,2-Dichloroethane	<1.0	<1.0
1,1-Dichloroethene	<1.0	<1.0
Trans-1,2-Dichloroethene	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0
Cis-1,3-Dichloropropene	<1.0	<1.0
Trans-1,3-Dichloropropene	<1.0	<1.0
Ethyl Benzene	<1.0	<1.0
Methylene Chloride	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0
Tetrachloroethylene	<1.0	<1.0
Toluene	3.5	7.4
1,1,1-Trichloroethane	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0
Trichloroethylene	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0
Vinyl Chloride	<1.0	<1.0
o-Xylene	<1.0	<1.0
m-Xylene	<1.0	*See Comments
p-Xylene	<1.0	1.7
SAMPLE NUMBER	GN950639	GN950644

	Housing Mx Influent
	COLLECTION DATE
EPA METHOD 615 (ug/L)	TUE, 16 MAY 1995
2,4-D	<1.2
2,4-DB	<0.91
Dalapon	<5.8
Dicamba	<0.27
Dichloroprop	<0.65
Dinoseb	<0.07
MCPA	<249
MCPP	<192
Silvex	<0.17
2,4,5-T	<0.20
SAMPLE NUMBER	GN950648
EPA METHOD 608 (ug/L)	
Heptachlor Epoxide	<0.83
Aldrin	<0.04
alpha-BHC	<0.03
beta-BHC	<0.06
delta-BHC	<0.09
Lindane (gamma-BHC)	<0.03
Chlordane	<0.14
4,4' DDD	<0.11
4,4' DDE	<0.04
p,p-DDT	<0.12
Dieldrin	<0.02
Endosulfan I	<0.14
Endosulfan II	<0.04
Endosulfan Sulfate	<0.66
Endrin	<0.06
Endrin Aldehyde	<0.23
Heptachlor	<0.03
Texaphene	<1.0
Aroclor 1016	<1.0
Aroclor 1221	<1.0
Aroclor 1232	<1.0
Aroclor 1242	<0.65
Aroclor 1248	<1.0
Aroclor 1254	<1.0
Aroclor 1260	<1.0
SAMPLE NUMBER	GN950647

* p-xylene result is sum of m- and p-xylene

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

Reagent and Equipment Blanks

	Reagent Blanks	Equipment Blank		Equipment Blank
GROUP A & B ANALYTES (mg/L)	**Sulfuric Acid**	**Pitcher**	**EPA METHOD 615 (ug/L)**	**Pitcher**
Chemical Oxygen Demand	21	<10	2,4-D	<1.9
Oil and Grease	2.96	8.56	2,4-DB	<1.4
Total Petroleum Hydrocarbon	2.92	5.92	Dalapon	<9
			Dicamba	<0.42
SAMPLE NUMBERS	GN950654	GN950657	Dichloroprop	<1
			Dinoseb	<0.11
GROUP D ANALYTES (mg/L)	**NaOH Reagent Blank**		MCPA	<388
Cyanide	<0.005		MCPP	<300
			Silvex	<0.27
GROUP E ANALYTES (ug/L)	**Sulfuric Acid**		2,4,5-T	<0.31
Phenols	62			
			SAMPLE NUMBER	GN950542
SAMPLE NUMBERS	GN950523			
			EPA METHOD 608 (ug/L)	
GROUP F ANALYTES (mg/L)	**Nitric Acid**			
Aluminum	<0.030	<0.030	Heptachlor Epoxide	<1.06
Antimony	<0.006	<0.006	Aldrin	<0.151
Arsenic	<0.010	<0.010	alpha-BHC	<0.038
Barium	<0.050	<0.050	beta-BHC	<0.077
Beryllium	<0.004	<0.004	delta-BHC	<0.115
Cadmium	<0.001	<0.001	Lindane (gamma-BHC)	<0.039
Total Chromium	<0.010	<0.010	Chlordane	<0.18
Cobalt	<0.050	<0.050	4,4' DDD	<0.14
Copper	<0.020	<0.020	4,4' DDE	<0.051
Iron	<0.030	<0.030	p,p-DDT	<0.154
Lead	<0.020	<0.020	Dieldrin	<0.026
Manganese	<0.030	<0.030	Endosulfan I	<0.18
Mercury	<0.0002	<0.0002	Endosulfan II	<0.051
Molybdenum	<0.030	<0.030	Endosulfan Sulfate	<0.85
Nickel	<0.030	<0.030	Endrin	<0.077
Selenium	<0.010	<0.010	Endrin Aldehyde	<0.30
Silver	<0.010	<0.010	Heptachlor	<0.39
Thallium	<0.002	<0.002	Texaphene	<1.28
Titanium	<0.050	<0.050	Aroclor 1016	<1.28
Vanadium	<0.050	<0.050	Aroclor 1221	<1.28
Zinc	<0.001	0.005	Aroclor 1232	<1.28
SAMPLE NUMBERS	GN950653	GN950656	Aroclor 1242	<0.83
			Aroclor 1248	<1.28
			Aroclor 1254	<1.28
Group G (mg/L)			Aroclor 1260	<1.28
Total Dissolved Solids (TDS)		55		
Surfactants		<0.1	SAMPLE NUMBER	GN950538
SAMPLE NUMBERS		GN950553		
				Equipment Blank
VOLATILE COMPOUNDS (ug/L)	**HCL Reagent**		**GROUP A ANALYTES (mg/L)**	**Sampler**
EPA 8021/624*	**Blank**	**Trip Blank**	Chemical Oxygen Demand	21
Benzene	<1.0	<1.0		
Benzyl Chloride	<1.0	<1.0	**GROUP D ANALYTES (mg/L)**	
Bromobenzene	<1.0	<1.0	Cyanide	<0.005
Bromodichloromethane	<1.0	<1.0		
Bromoform	<1.0	<1.0	**GROUP E ANALYTES (ug/L)**	
Bromomethane	<1.0	<1.0	Phenols	15
Carbon tetrachloride	<1.0	<1.0		
Chlorobenzene	<1.0	<1.0	**GROUP F ANALYTES (mg/L)**	
Chlorodibromomethane	<1.0	<1.0	Aluminum	<0.030
Chloroethane	<1.0	<1.0	Antimony	<0.006
Chloroform	<1.0	<1.0	Arsenic	<0.010
2-Chlorethylvinyl Ether	<1.0	<1.0	Barium	<0.050
Chloromethane	<1.0	<1.0	Beryllium	<0.004
Chlorodibromomethane	<1.0	<1.0	Cadmium	<0.001
Dibromomethane	<1.0	<1.0	Total Chromium	<0.010
1,2-Dichlorobenzene	<1.0	<1.0	Cobalt	<0.050
1,3-Dichlorobenzene	<1.0	<1.0	Copper	<0.020
1,4-Dichlorobenzene	<1.0	<1.0	Iron	<0.030
Dichlorodifluoromethane	<1.0	<1.0	Lead	<0.020
1,1-Dichloroethane	<1.0	<1.0	Manganese	<0.030
1,2-Dichloroethane	<1.0	<1.0	Mercury	<0.0002
1,1-Dichloroethene	<1.0	<1.0	Molybdenum	<0.030
Trans-1,2-Dichloroethene	<1.0	<1.0	Nickel	<0.030
1,2-Dichloropropane	<1.0	<1.0	Selenium	<0.010
Cis-1,3-Dichloropropene	<1.0	<1.0	Silver	<0.010
Trans-1,3-Dichloropropene	<1.0	<1.0	Thallium	<0.002
Ethyl Benzene	<1.0	<1.0	Titanium	<0.050
Methylene Chloride	<1.0	<1.0	Vanadium	<0.050
1,1,1,2-Tetrachloroethane	<1.0	<1.0	Zinc	0.002
1,1,2,2-Tetrachloroethane	<1.0	<1.0		
Tetrachloroethylene	<1.0	<1.0	SAMPLE NUMBER	GN950534
Toluene	<1.0	<1.0		GN950535
1,1,1-Trichloroethane	<1.0	<1.0		
1,1,2-Trichloroethane	<1.0	<1.0		
Trichloroethylene	<1.0	<1.0		
Trichlorofluoromethane	<1.0	<1.0		
1,2,3-Trichloropropane	<1.0	<1.0		
Vinyl Chloride	<1.0	<1.0		
o-Xylene	<1.0	<1.0		
m-Xylene	<1.0	<1.0		
p-Xylene	<1.0	<1.0		
SAMPLE NUMBER	GN950522	GN950659		

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

Equipment Blanks

VOLATILE COMPOUNDS (ug/L)	PITCHER		PITCHER	SAMPLING DEVICE
EPA 8021/624*	Equipment Blank		COLLECTION DATE	COLLECTION DATE
Benzene	<1-<5	EPA METHOD 606/625 (ug/L)	THU, 18 MAY 95	THU, 18 MAY 95
Benzyl Chloride	<1-<5	Acenaphthene	<15	<15
Bromobenzene	<1-<5	Acenaphthylene	<15	<15
Bromodichloromethane	<1-<5	Anthracene	<15	<15
Bromoform	<1-<5	Benzidine	<75	<75
Bromomethane	<1-<5	Benzo(a)anthracene	<15	<15
Carbon tetrachloride	<1-<5	Benzo(b)fluoranthene	<15	<15
Chlorobenzene	<1-<5	Benzo(k)fluoranthene	<15	<15
Chlorodibromomethane	<1-<5	Benzo(a)pyrene	<15	<15
Chloroethane	<1-<5	Benzo(ghi)perylene	<15	<15
Chloroform	<1-<5	Benzyl butyl phthalate	<15	<15
2-Chlorethylvinyl Ether	<1-<5	Bis(2-chloroethyl)ether	<15	<15
Chloromethane	<1-<5	Bis(2-chloroethoxy)methane	<15	<15
Chlorodibromomethane	<1-<5	Bis(2-ethylhexyl)phthalate	<15	<15
Dibromomethane	<1-<5	Bis(2-chloroisopropyl)ether	<15	<15
1,2-Dichlorobenzene	<1-<5	4-Bromophenyl phenyl ether	<15	<15
1,3-Dichlorobenzene	<1-<5	2-Chloronaphthalene	<15	<15
1,4-Dichlorobenzene	<1-<5	4-Chlorophenyl phenyl ether	<15	<15
Dichlorodifluoromethane	<1-<5	Chrysene	<15	<15
1,1-Dichloroethane	<1-<5	Dibenzo(a,h)anthracene	<15	<15
1,2-Dichloroethane	<1-<5	Di-n-butylphthalate	<15	<15
1,1-Dichloroethene	<1-<5	1,2-Dichlorobenzene	<15	<15
Trans-1,2-Dichloroethene	<1-<5	1,3-Dichlorobenzene	<15	<15
1,2-Dichloropropane	<1-<5	1,4-Dichlorobenzene	<15	<15
Cis-1,3-Dichloropropene	<1-<5	3,3-Dichlorobenzidine	<30	<30
Trans-1,3-Dichloropropene	<1-<5	Diethyl phthalate	<15	<15
Ethyl Benzene	<1-<5	Dimethyl phthalate	<15	<15
Methylene Chloride	<1-<5	2,4-Dinitrotoluene	<15	<15
1,1,1,2-Tetrachloroethane	<1-<5	2,6-Dinitrotoluene	<15	<15
1,1,2,2-Tetrachloroethane	<1-<5	Di-n--octyl phthalate	<15	<15
Tetrachloroethylene	<1-<5	Fluoranthene	<15	<15
Toluene	<1-<5	Fluorene	<15	<15
1,1,1-Trichloroethane	<1-<5	Hexachlorobenzene	<15	<15
1,1,2-Trichloroethane	<1-<5	Hexachlorobutadiene	<15	<15
Trichloroethylene	<1-<5	Hexachlorocyclopentadiene	<15	<15
Trichlorofluoromethane	<1-<5	Hexachloroethane	<15	<15
1,2,3-Trichloropropane	<1-<5	Indeno(1,2,3-cd)pyrene	<15	<15
Vinyl Chloride	<1-<5	Isophorone	<15	<15
o-Xylene	<1-<5	Naphthalene	<15	<15
m-Xylene	<1-<5	Nitrobenzene	<15	<15
p-Xylene	<1-<5	N-Nitrosodimethylamine	<15	<15
SAMPLE NUMBER	GN950536,GN950539	N-Nitrosodi-n-propylamine	<15	<15
SAMPLE NUMBER	GN950659	N-Nitrosodiphenylamine	<15	<15
		Phenanthrene	<15	<15
		Pyrene	<15	<15
		1,2,4-Trichlorobenzene	<15	<15
		4-Chloro-3-methylphenol	<15	<15
		2-Chlorophenol	<15	<15
		2,4-Dichlorophenol	<15	<15
		2,4-Dimethylphenol	<15	<15
		2,4-Dinitrophenol	<75	<75
		2-Methyl-4,6-dinitrophenol	<75	<75
		2-Nitrophenol	<15	<15
		4-Nitrophenol	<75	<75
		Pentachlorophenol	<75	<75
		Phenol	<15	<15
		2,4,6-Trichlorophenol	<15	<15
		SAMPLE NUMBER	GN950540	GN950537

RANDOLPH AFB, TEXAS

WASTEWATER CHARACTERIZATION SURVEY: 12 MAY - 19 MAY 1995

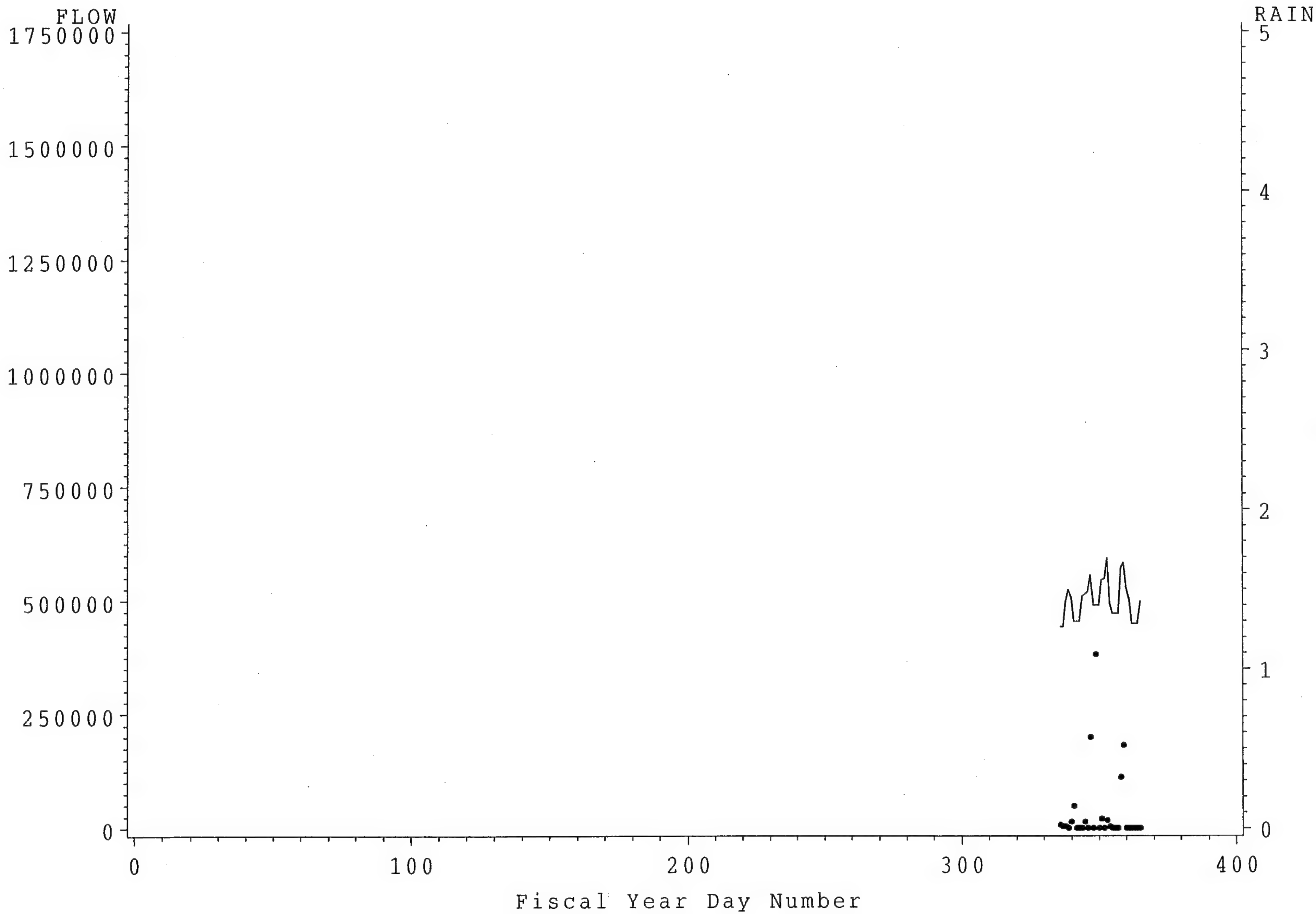
QA/QC Spikes

SPIKES ERA LOT 9962	SPIKES ERA LOT 9962	SPIKES ERA LOT 9962	SPIKES ERA LOT 9962	SPIKES ERA LOT 9962	RANGE in ug/L
GROUP F ANALYTES (mg/L)					
Aluminum	0.256	0.213	0.252	0.273	424-610
Antimony	0.805	0.747	0.163	0.158	65.6-103
Arsenic	0.047	0.043	0.045	0.044	81-187
Barium	0.069	0.063	0.069	0.065	130-187
Beryllium	0.05	0.046	0.05	0.047	95.7-138
Cadmium	0.07	0.058	0.09	0.12	120-172
Total Chromium	0.083	0.076	0.083	0.078	85.4-123
Cobalt	0.067	0.061	0.067	0.063	126-182
Copper	0.081	0.074	0.08	0.076	157-226
Iron	0.114	0.092	0.102	0.098	185-266
Lead	0.028	0.02	0.02	0.03	116-167
Manganese	0.049	0.045	0.05	0.046	96-138
Mercury	0.0007	0.0008	0.001	0.0011	2.50-4.17
Molybdenum	0.076	0.07	0.076	0.072	144-207
Nickel	0.073	0.067	0.074	0.069	137-197
Selenium	0.05	0.044	0.049	0.047	81.3-128
Silver	0.056	0.052	0.058	0.056	106-152
Thallium	0.075	0.07	0.076	0.071	65.6-103
Vanadium	0.11	0.101	0.111	0.104	212-305
Zinc	0.097	0.08	0.125	0.08	126-182
SAMPLE NUMBER	GN950399	GN950500	GN950398	GN950397	
SPIKES ERA LOT 9939	**SPIKES ERA LOT 9939**	**SPIKES ERA LOT 9962**	**SPIKES ERA LOT 9962**	**SPIKES ERA LOT 9962**	
GROUP A ANALYTES(mg/L)					
Chemical Oxygen Demand	126	136	128	126	133-181 mg/L
GROUP B ANALYTES (mg/L)					
Oil and Grease	71	58	70	60	33.6-70 mg/bt
Total Petroleum Hydrocarbon	71	51	69	54	
GROUP D ANALYTES (mg/L)					
Cyanide		0.39	0.55	0.42	0.295-0.513 ug/L
GROUP E ANALYTES (ug/L)	ERA LOT 9957	ERA LOT 9957			
Phenols	125	118	125	124	0.0889-0.145 mg/L
Group G (mg/L)	Lot # WP1187/9962/9939				
Dissolved Solids (TDS)	526		593	579	Lot # WP1187
					360-470 mg/L
					Lot # 9962
					50.8-68.8 or
					1070-1390 mg/L
					Lot # 9939
					51 - 71 mg/L or
					1180-1540 mg/L
SAMPLE NUMBER	GN950506	GN950505	GN950504	GN950503	

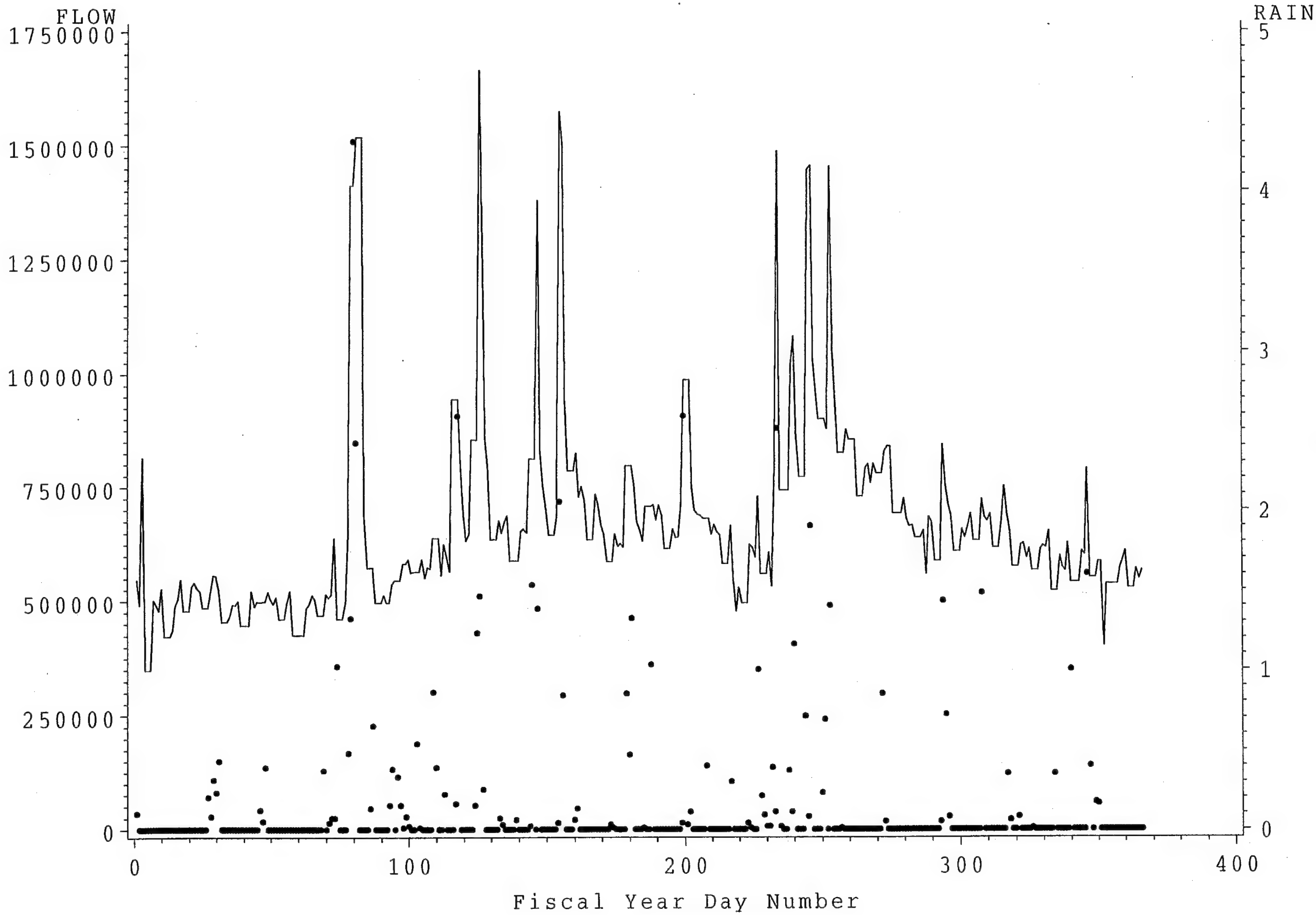
APPENDIX C

Sewer Flow vs Same-Day Rainfall

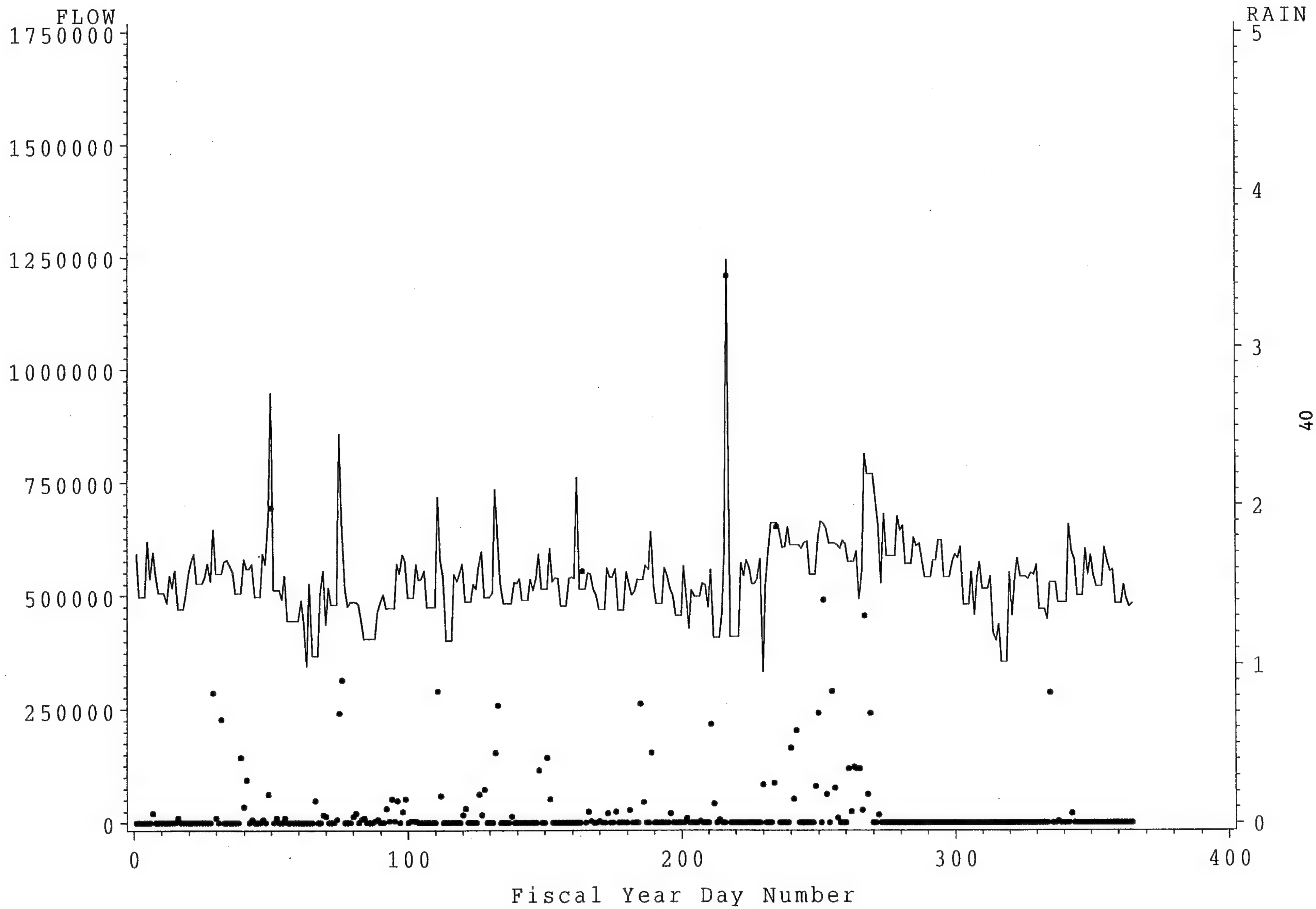
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1991



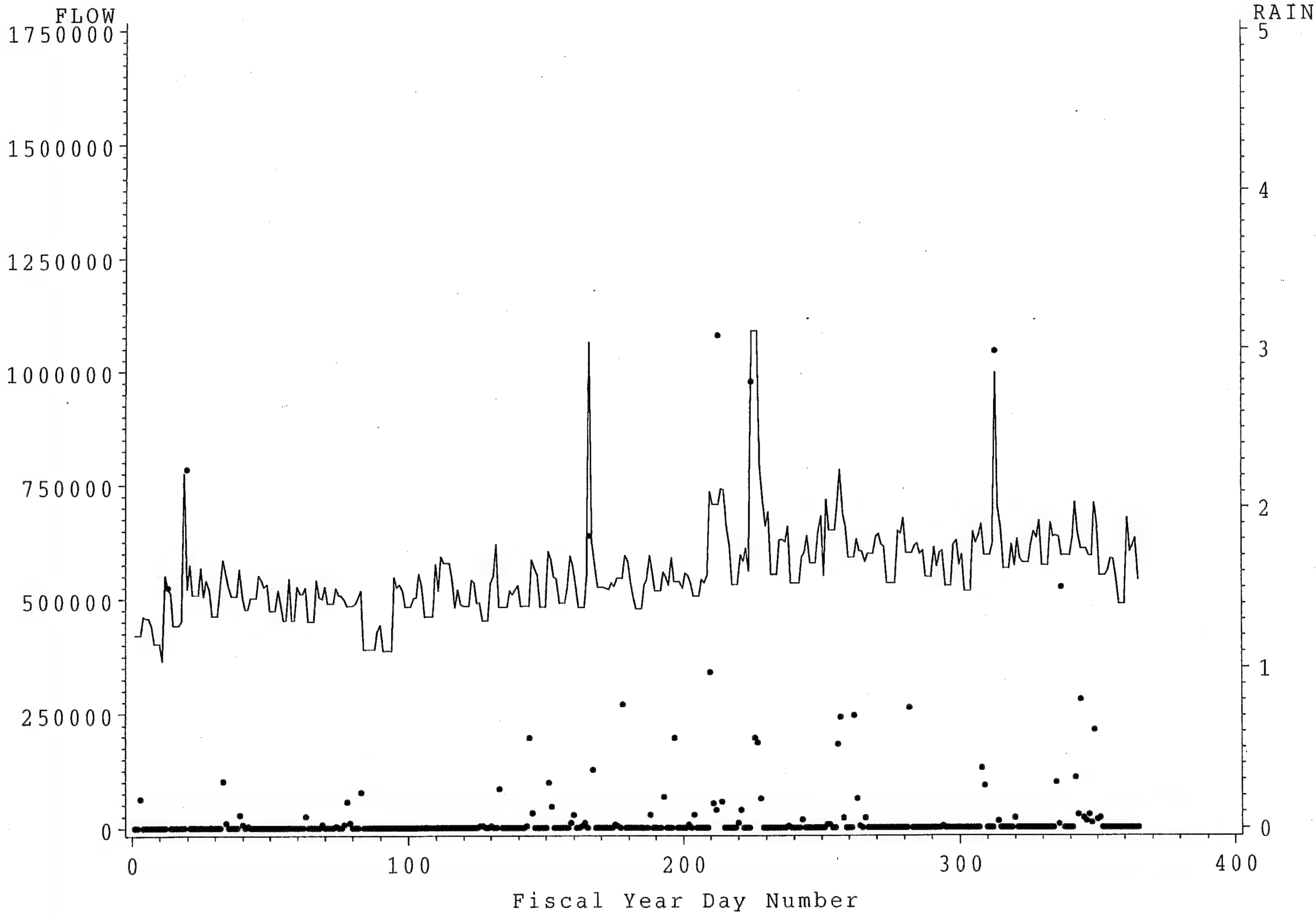
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1992



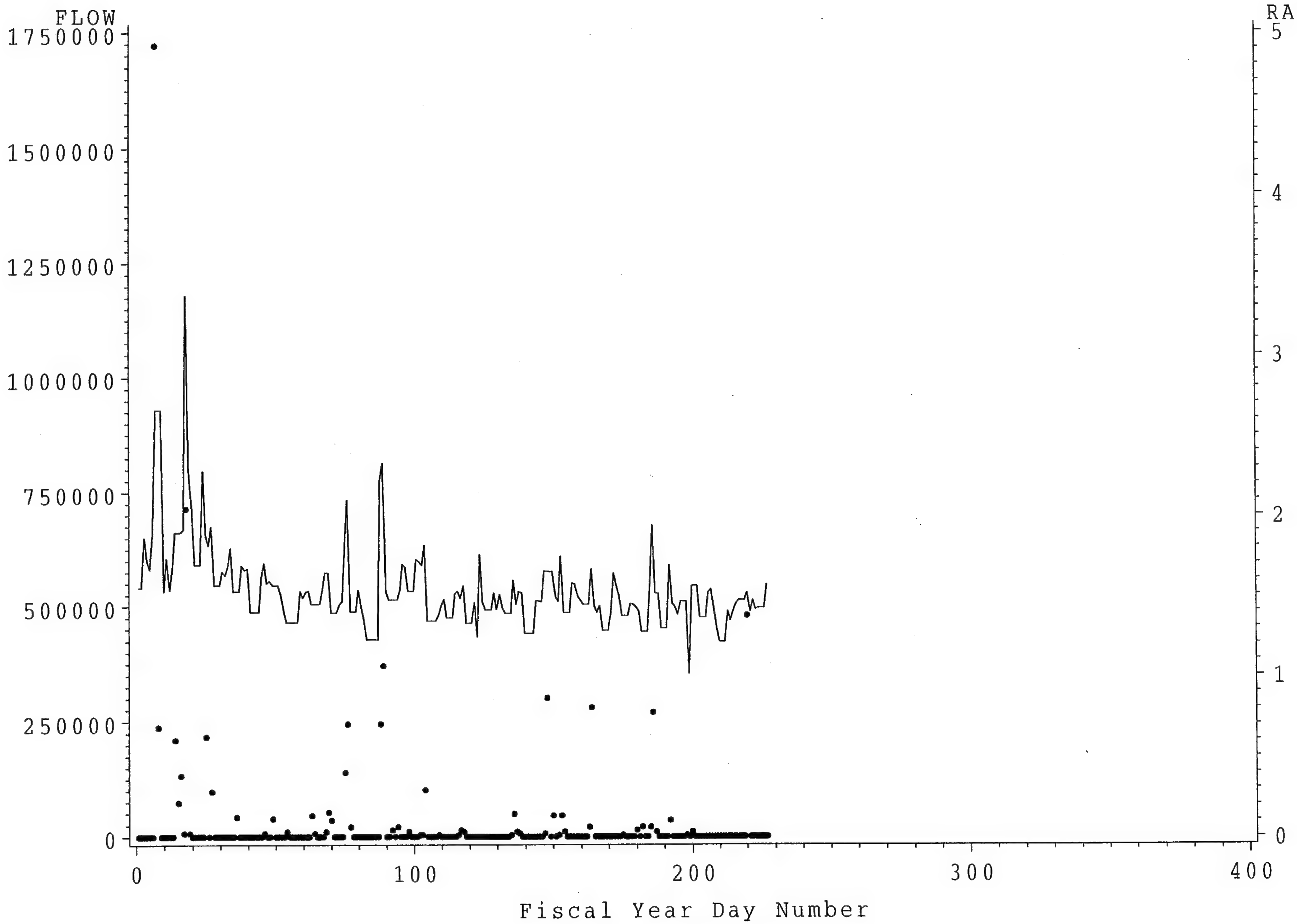
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1993



Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1994



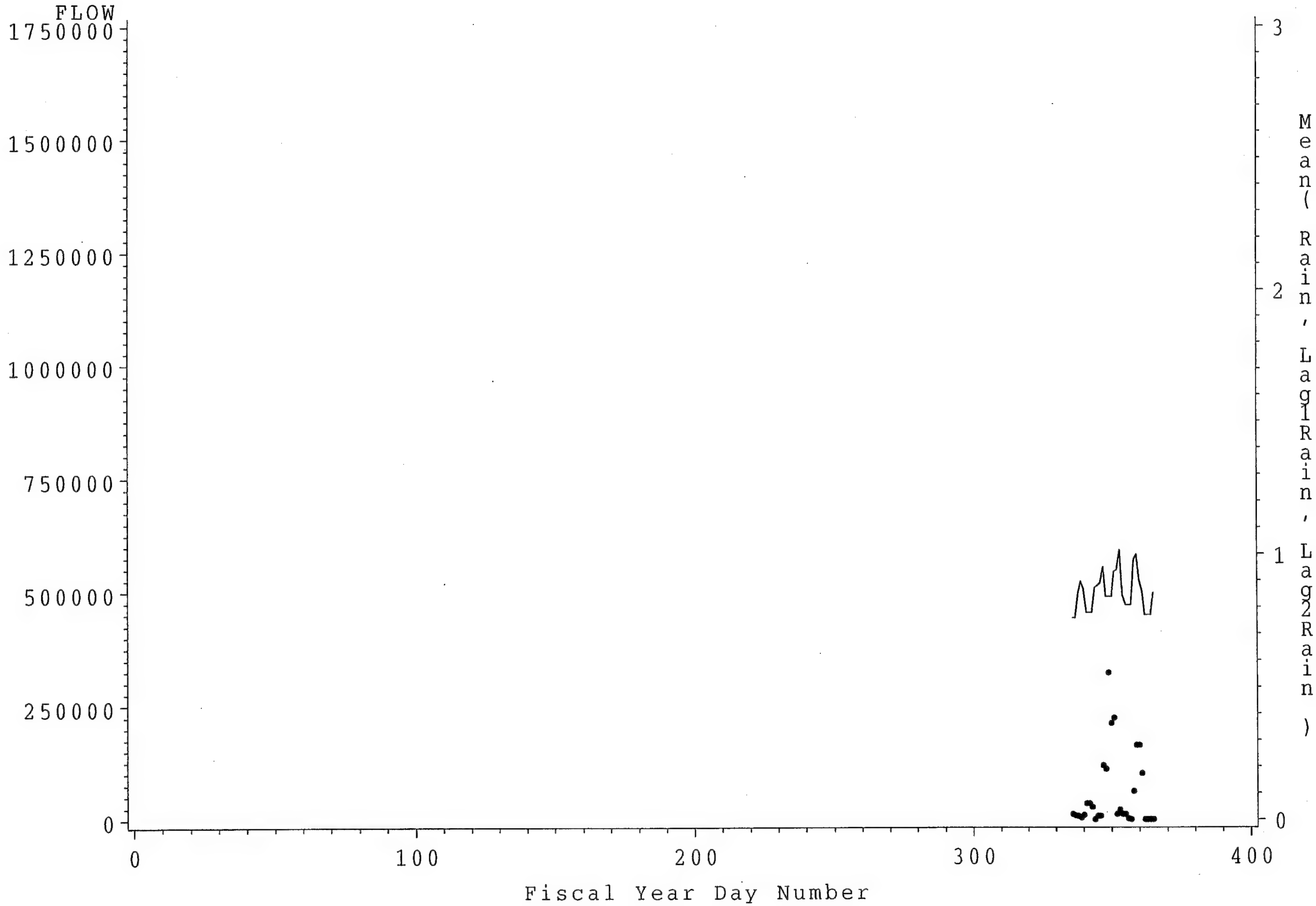
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1995



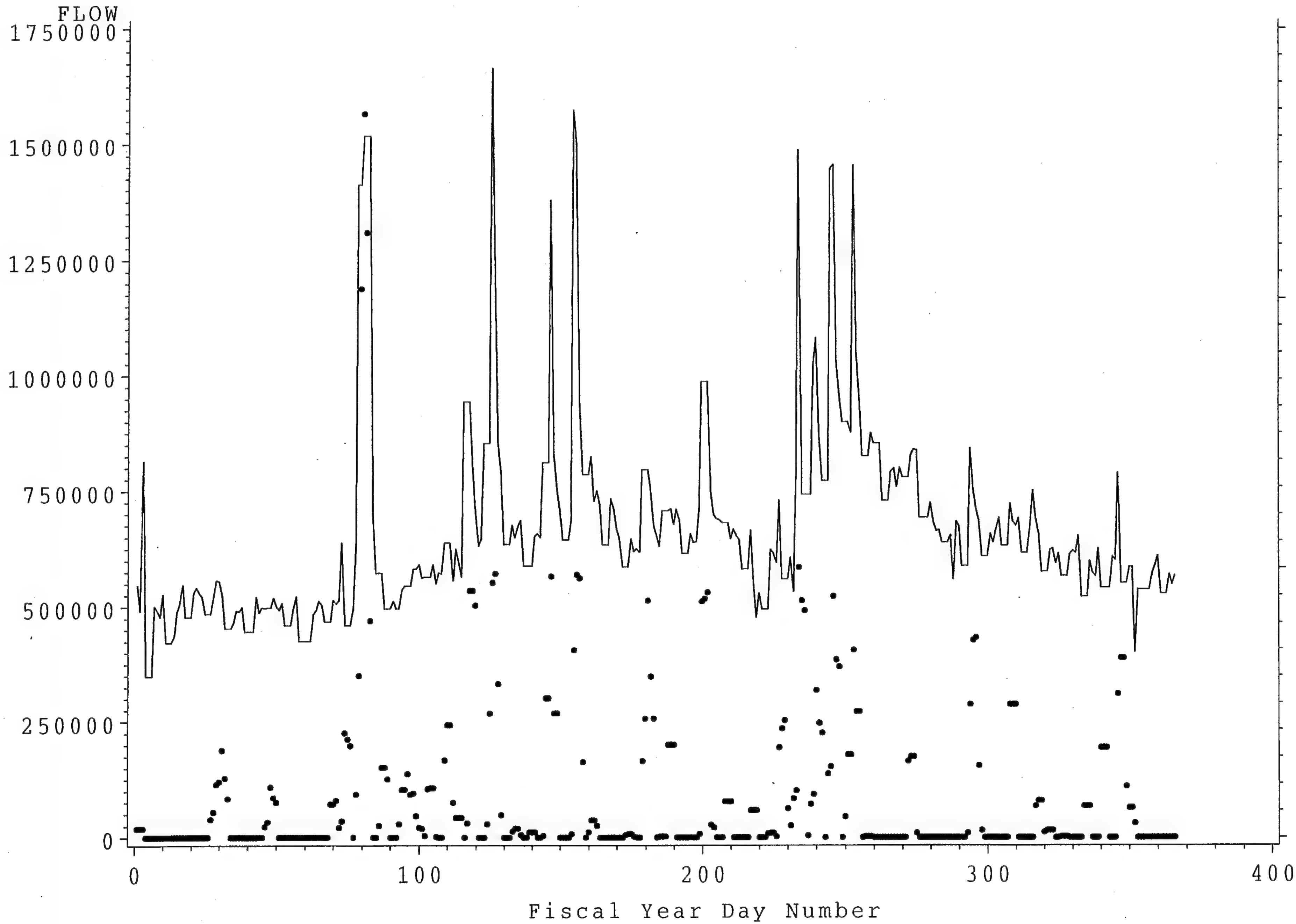
APPENDIX D

Sewer Flow vs Three-Day Rainfall

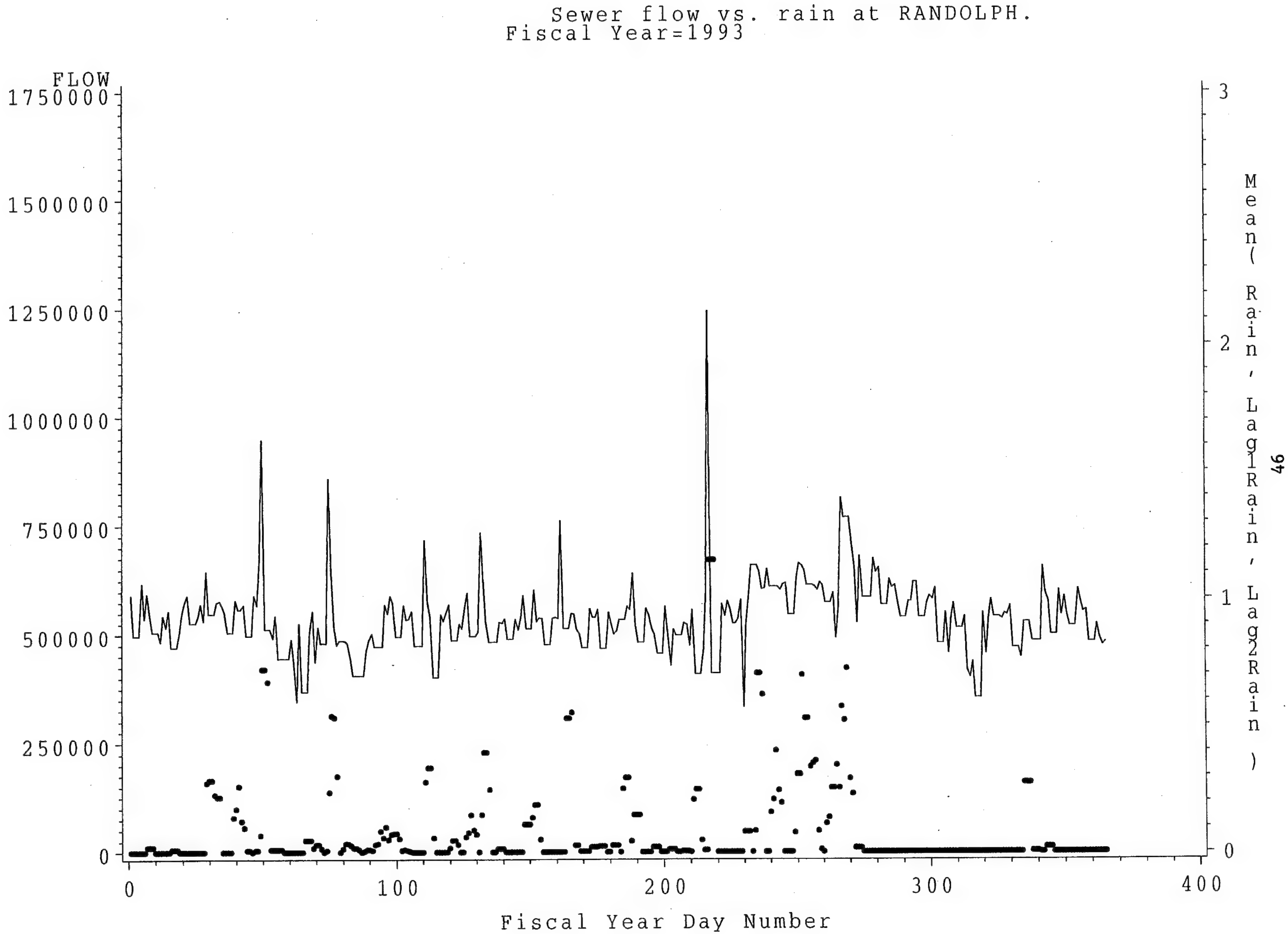
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1991



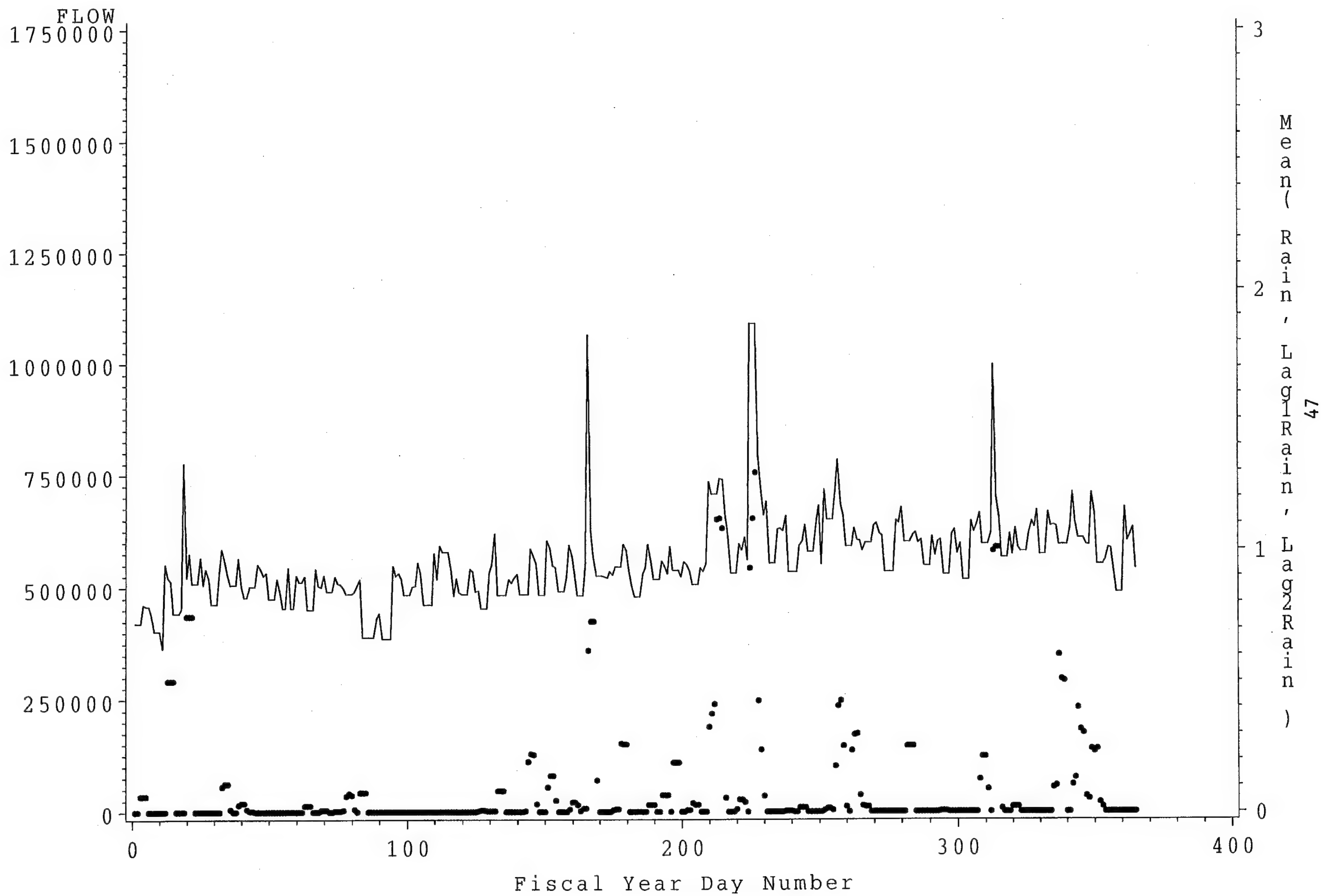
Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1992

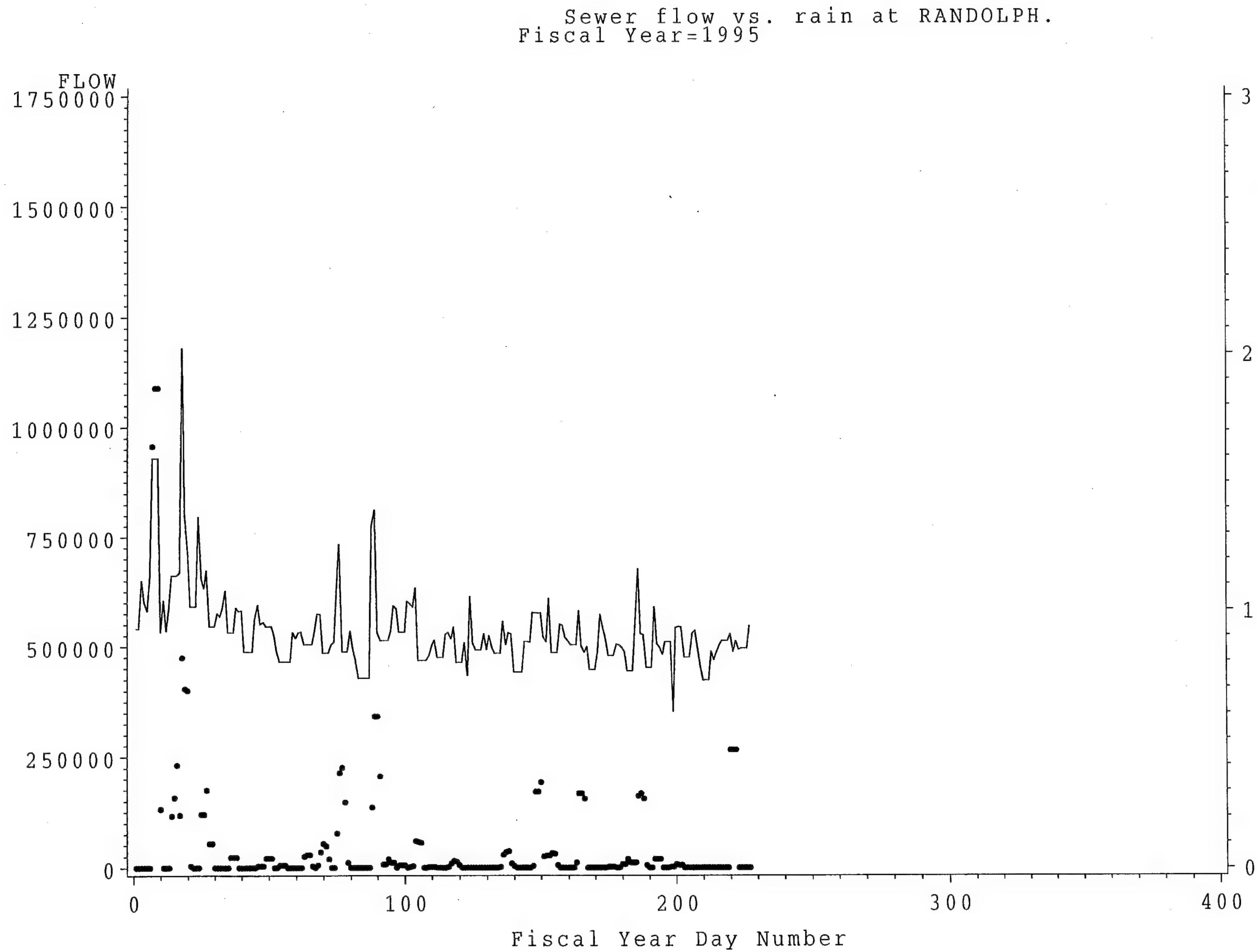


45


Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1993
FLOW
1750000
1500000
1250000
1000000
750000
500000
250000
0
Mean(Rain, Lag1Rain, Lag2Rain)
3
2
1
0
0
100
200
300
400
Fiscal Year Day Number

Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1994

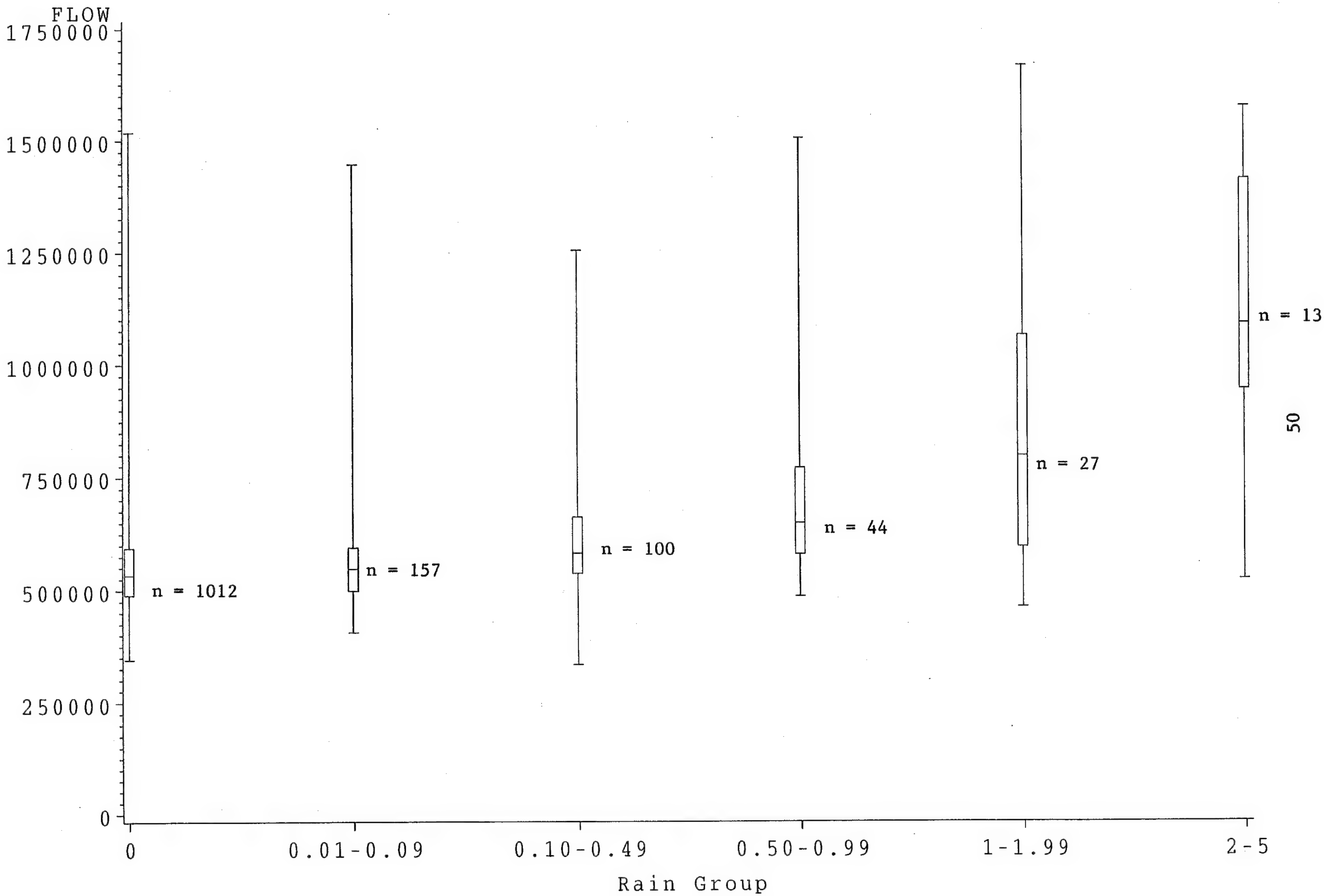



Sewer flow vs. rain at RANDOLPH.
Fiscal Year=1995
FLOW
1750000
1500000
1250000
1000000
750000
500000
250000
0
Mean(Rain, Lag1Rain, Lag2Rain)
3
2
1
0
0
100
200
300
400
Fiscal Year Day Number

APPENDIX E

Sewer Flow vs Rainfall Ranges, Same-Day

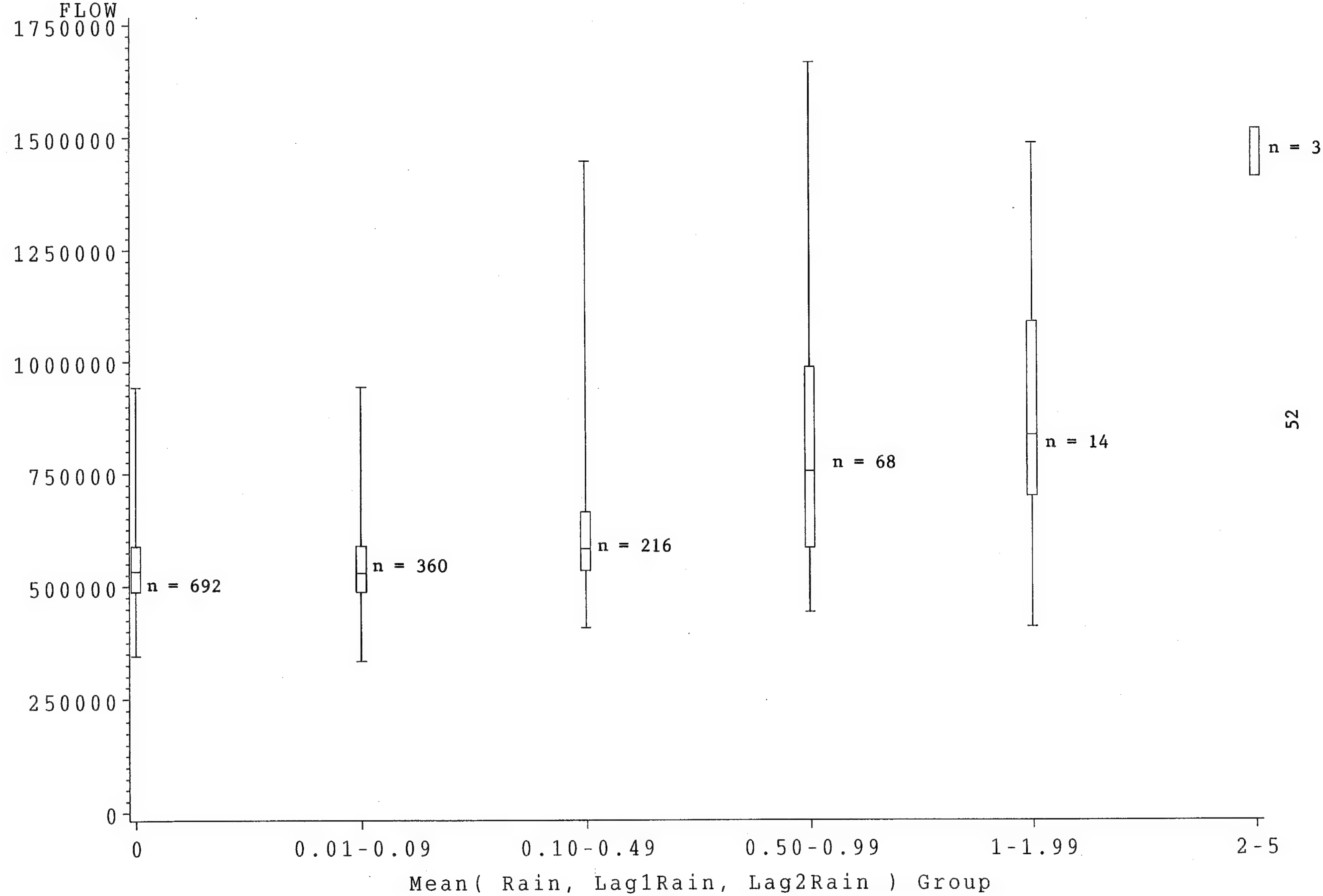
Sewer flow vs. rain at RANDOLPH.



APPENDIX F

Sewer Flow vs Rainfall Ranges, Three-Day

Sewer flow vs. rain at RANDOLPH.



APPENDIX G

Section 4, Industrial Waste Order, Cibolo Creek Municipal Authority

SECTION 4. Regulations.

4.1 General Discharge Prohibitions. No user shall indirectly contribute or cause to be contributed, any pollutant or wastewater which will interfere with the operation or performance of the POTW. These general prohibitions apply to all such users of a POTW whether or not the user is subject to National Categorical Pretreatment Standards or any other National, State, or local Pretreatment Standards or Requirements. A user may not contribute the following substances to any POTW:

(a) Any liquids, solids or gases, which by reason of their nature or quantity are, or may be sufficient, either alone or by interaction with other substances, to cause fire or explosion or be injurious in any other way to the POTW or to the operation of the POTW. At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system, or at any other pint in the system, be more than five percent (5%) nor any single reading be over ten percent (10%) of the Lower Explosive Limit (LEL) of the meter. Prohibited materials include but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alchohols, ketones, aldehydes, peroxides, chlorates, peroxides, bromates, carbides, hydrides and sulfides and any other substances which the Authority, the State or EPA has notified the user is a fire hazard to the system.

(b) Solid or viscous substances in such quantities and/or qualities which may cause obstruction to the flow in a sewer or other interference with the operation of the wastewater treatment facilities such as, but not limited to: grease, garbage with particles greater than one-half (1/2") in dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshing, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, gas, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, mud or glass grinding or polishing wastes.

(c) Any wastewater having a strength greater than:

BOD_5	250 mg/l
COD	625 mg/l
TSS	250 mg/1

(NOTE: Under certain conditions, depending upon the constituents in the wastewater, the Authority may agree to accept marginally higher strength wastewater on a continuing basis. In such cases, a special sewer charge will be established for each 1000 gallons of that specific sewer return flow.)

(d) Any wastewater having a pH less than 5.5 or greater than 10.5, or wastewater having any other corrosive property capable of causing inordinate damage or hazard to structures, equipment, and/or personnel of the POTW.

(e) Any wastewater containing toxic pollutants in sufficient quantity, either singly or by interaction with other pollutants, to injure or interfere with any wastewater treatment process, constitute a hazard to humans or animals, create a toxic effect in the receiving stream at the POTW, or to exceed the limitation set forth in a Categorical Pretreatment Standard. A toxic pollutant shall include but not be limited to any pollutant identified pursuant to Section 307(a) of the Act.

(f) Any noxious or malodorous liquids, gases, or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to physically prevent reasonable safe and/or tolerable human and/or mechanical entry into the sewers for inspection, maintenance and repair purposes.

(g) Any substance which may cause the POTW's effluent or any other product of the POTW such as residues, sludges, or scums, to be unsuitable for normal landfill disposal, land application reclamation or reuse, or to interfere with the reclamation process where the POTW is pursuing a reuse and reclamation program. In no case, shall a substance discharged to the POTW cause the POTW to be in noncompliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 of the Act; any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, or State criteria applicable to sludge management and/or disposal methods being used.

(k) Any pollutants, including oxygen demanding pollutants (BOD, etc.) released at a flow and/or pollutant concentration which a user knows or should have reason to know will cause interference to the POTW.

(l) Any wastewater containing any radioactive wastes or isotopes of such half life or concentration as may exceed limits as permitted by the most current Federal or State regulations or as established by the Manager in compliance with applicable State or Federal regulations.

(m) Any wastewater which creates a public nuisance. When the Manager determines that a user(s) is indirectly discharging to the POTW any of the above enumerated substances in such quantities or concentrations so as to interfere with the operation or performance of the POTW, he shall; 1) advise the user (s) of the impact of the indirect discharge on the POTW; and 2) develop effluent limitation(s) for such user to correct the interference with the POTW.

4.2 <u>Federal Categorical Pretreatment Standards.</u> After the promulgation of the Federal Categorical Pretreatment Standard for a particular industrial subcategory, and upon expiration of any compliance grace period, the Federal Standard, if more stringent than limitations imposed under this Order for sources in that subcategory, shall supersede and replace the limitations imposed under this Order for that particular industrial subcategory. Federal Categorical Pretreatment Standards that are more stringent than limitations imposed under this Order for sources in a particular industrial subcategory and are already in existence at the time this order becomes effective, shall also supersede and replace the limitations imposed under this Order as they apply to the particular industrial subcategory so regulated. The Manager shall notify all effected users of the modified applicable reporting requirements under 40 CFR, Part 403, Section 403.12.

4.3 <u>Modification of Federal Categorical Pretreatment Standards.</u>
Where the Authority's wastewater treatment system achieves consistent removal of pollutants limited by Federal Pretreatment Standards, the Authority may apply to the Approval Authority for modification of specific limits in the Federal Pretreatment Standards. "Consistent removal" shall mean reduction in the amount of a pollutant or alteration of the nature of the pollutant by the wastewater treatment system to a less toxic or harmless state in the effluent which is achieved by the system in 95 percent of the samples taken when measured according to the procedures set forth in 40 CFR, Part 403, Section 403.7, "General Pretreatment Regulations for Existing and New Sources of Pollution" promulgated pursuant to the Act. The Authority may modify pollutant discharge limits in the Federal Pretreatment Standards if the requirements contained in 40 CFR, Part 403.7 are fulfilled and prior approval from the Approval Authority is obtained.

4.4 <u>Specific Pollutant Limitations.</u> No person shall discharge wastewater containing in excess of the pollutant limits below. The very stringent requirements result from characteristics of the receiving stream for Authority's wastewater discharge; Water Quality Segment 1913, Mid-Cibolo Creek. The Wasteload Evaluation of January 1987 (WLE 87-01) for Segment 1913 assumes a seven day-two year low flow (702) of .1 CFS. The Texas Water Commission uses this low flow figure with the Authority's permitted daily average flow to calculate appropriate limitations under Texas Administrative Code 307.1 - 307.10. These limits are based on either flow-proportional or time-proportional composite samples, (usually of 24 hours duration), and are expressed in either micromilligrams per liter, (ug/l) or milligrams per liter (mg/l), as indicated.

15.0 ug/l arsenic	2000.0 ug/l manganese
2000.0 ug/l barium	3.0 UG/L mercury
1.5 ug/l cadmium	14.0 ug/l nickel
13.0 ug/l chromium (total)	20.0 ug/l selenium
16.0 ug/l copper	3.0 ug/l silver
14.0 ug/l lead	1/0 ug/l zinc
	200.0 mg/l free or emulsified oils and grease

Note: Specific pollutant limitations may be adjusted on a case by case basis if shown, through an engineering study acceptable to the Authority, submitted by a registered professional engineer, that no detrimental impact will result to the system, its processes or by-products.

4.4.1 Other Heavy Metals. No other heavy metals or toxic materials may be discharged in public sewers without a permit from the Authority specifying conditions of pretreatment, concentrations, volumes, and other applicable provisions.

Prohibited heavy metals and toxic materials include but are not limited to:

Antimony,
Beryllium,
Bismuth,
Cobalt,
Molybdenum,
Tin,
Uranyl ion,
Rhenium,
Strontium,
Tellurium,
Herbicides,
Fungicides, and
Pesticides.

4.5 Storm Water and Other Unpolluted Drainage.

(a) No person may discharge to public sanitary sewers
- (1) unpolluted storm water, surface water, ground water, roof runoff or subsurface drainage;
- (2) unpolluted cooling water;
- (3) unpolluted industrial process waters; or
- (4) other unpolluted drainage.

(b) In compliance with the Texas Water Quality Act and other statutes, the Authority may designate storm sewers and other watercourses into which unpolluted drainage, described in subsection (a) of this section, may be discharged.

4.6 State Requirements. State specific pollutant requirements and limitations, if any on indirect discharges shall immediately supersede and replace the requirements and limitations imposed by this Order when the State requirements are more stringent than either Federal or Authority standards and requirements.

4.7 Authority's Right of Revision. The Authority reserves the right to amend this Order at any time to establish more stringent specific pollutant limitations or requirements on indirect discharges to the Regional System, if deemed necessary by the Authority to protect the POTW processes or to cure or prevent an effluent quality problem in treated wastewater and/or resulting sludges. The Authority reserves the right to amend this Order to comply with the general objectives and purposes presented in Section 2 of this Order.

4.8 Prohibition of Dilution. No user shall ever increase the use of process water, unpolluted water, surface water, surface water or storm water or in any other way attempt to dilute either a direct or indirect discharge as a partial or complete substitute for adequate treatment to achieve compliance

with the specific pollutant limitations contained in the federal Categorical Pretreatment Standards, or in any other specific pollutant limitations promulgated by the Authority and/or State and incorporated in this Order.

4.9 Accidental Discharges. Each user shall provide protection from accidental discharge of prohibited materials or other substances regulated by this Order. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the owner or user's own cost and expense. Detailed plans showing facilities and operating procedures to provide this protection may be required to be submitted to the Authority for review, and shall be approved by the Authority before construction of the facility. No user who commences contribution to the POTW after the effective date of this Order shall be permitted to introduce pollutants into the system until accidental discharge procedures have been approved by the Authority. Review and approval of such plans and operating procedures shall not relieve the industrial user from the responsibility to modify the user's facility as necessary to meet the requirements of this Order. In the case of an accidental discharge, it is the responsibility of the user to immediately telephone and notify the Manager the incident. The notification shall include the time and location of the discharge, type of waste, concentration and volume, and corrective actions taken.

4.10 Written Notice. Within five (5) working days following an accidental discharge, the user shall be required to submit to the Manager or to his designated representative, a written letter report describing the cause of the discharge and the measures to be taken by the user to prevent similar future occurrences. Such notification shall not relieve the user of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, the environment, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties, or other liability which may be imposed by this Order or other applicable law. Failure to notify the Manager of an accidental discharge may result in legal action or discontinuation of service.

4.11 Notice to Employees. Employers shall take measures to insure that all appropriate employees be advised of the notification procedure to be used in the event of an accidental discharge.